



Internet of Things

Five themes from CES 2025 and recent conversations

FIRST ANALYSIS QUARTERLY INSIGHT

Integrative insights on emerging opportunities

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 **First Analysis**

David Gearhart, CFA

Direct: 312-258-7128
dgearhart@firstanalysis.com

Main: 312-258-1400
www.firstanalysis.com

Charles Morgan

Direct: 312-258-7147
cmorgan@firstanalysis.com

First Analysis Internet of Things Team

Howard Smith

Managing Director
hsmith@firstanalysis.com
312-258-7117

David Gearhart

Senior Vice President
dgearhart@firstanalysis.com
312-258-7128

Matthew Nicklin

Managing Director
mnicklin@firstanalysis.com
312-258-7181

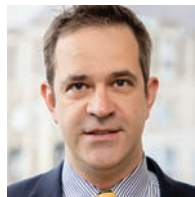
Charles Morgan

Analyst
cmorgan@firstanalysis.com
312-258-7147

First Analysis

1 S. Wacker Dr., Suite 3900
Chicago, IL 60606
312-258-1400
www.firstanalysis.com

About the Authors



David Gearhart, CFA

David Gearhart has worked in finance and investment for over two decades and joined First Analysis in 2011. He works with entrepreneurs as an investor and as an advisor on growth transactions to help build leading Internet of Things and e-commerce software businesses. He has played a key role in building First Analysis' Internet of Things and e-commerce franchises and is a thought leader in his sectors, having authored several widely read white papers. He supports First Analysis' investments in CoolR Group, EdgelQ, Freeosk and Smart-Commerce. Prior to joining First Analysis, he was an accountant with The Northern Trust Co. and an options broker with American Option Services. He earned a bachelor's degree from Purdue University with a concentration in economics and finance and his MBA at DePaul University with a focus on finance and entrepreneurship. He is a CFA charterholder.



Charles Morgan

Charles Morgan is an analyst with First Analysis. He joined the firm in 2022 after completing two internships. Charles graduated from Denison University in 2022 with a bachelor's degree in economics.

About First Analysis

First Analysis has a four-decade record of serving emerging growth companies, established industry leaders and institutional investors in emerging high-growth segments in technology and healthcare, both through its venture capital investments and through First Analysis Securities Corp. (FASC), which provides investment banking and related services. FASC is a FINRA-registered broker-dealer and member SIPC. First Analysis' integrative research process underpins all its efforts, combining 1) dynamic investment research on thousands of companies with 2) thousands of relationships among executives, investors and other key participants in our focus areas, yielding a deep, comprehensive understanding of each sector's near-term and long-term potential.

INTERNET OF THINGS

Five themes from CES 2025 and recent conversations

- Based on our meetings and observations on the CES show floor and follow-up conversations with attending companies in the weeks since then, we identified five key themes for B2B IoT.
- First, our conversations suggest consolidation among connected car tech companies is already underway and set to accelerate. We think only a handful of vendors will likely emerge as true leaders among literally hundreds of players.
- Second, while in-car payment is a logical use of vehicles' embedded connectivity and digital capabilities and a natural part of the software-defined vehicle evolution, we think it makes most sense for activities that are clearly vehicle related, such as paying tolls, reserving and paying for parking, and EV charging and paying for car washes. We think these solutions will see the greatest adoption.
- Third, we continue to see progress in energy harvesting technology and expect it to see strong adoption eventually, but we think it will be at least a few more years before it becomes mainstream unless more vendors evangelize with actual products.
- Fourth, we expect autonomy backup technology to become an industry standard for all autonomous programs. Autonomy backup tech enables remote human operators to take control of autonomous vehicles and similar systems when autonomy fails.
- Lastly, we see a surprising number of IoT solution companies seeking to acquire connectivity assets in the already-consolidating MVNO market.

ONCE AGAIN, A PRIME FORUM FOR THE INTERNET OF THINGS

Our attendance at the 2025 CES show, otherwise known as the Consumer Electronics Show, reinforced our view it has become a prime forum for the Internet of Things. While the show remains centered on consumer offerings, it featured an increased proportion of business-to-business (B2B) companies compared to prior years.

We met with over 50 B2B IoT exhibitor and attendee companies across the IoT value chain at the show and had follow-up conversations in the following weeks. These companies' focuses ranged from enabling hardware to network connectivity to in-

infrastructure and end-user application software. They encompassed both point solutions and end-to-end solutions for a wide range of vertical markets and use cases, including connected cars, network connectivity, middleware software, energy harvesting, hardware-agnostic IoT full solutions, and robotics. We expect CES to continue to rise in prominence as a highly productive forum for B2B IoT companies and to draw an increasing number of industry participants given the quantity and quality of customer, partner and investor meetings it offers.

Based on our conversations and observations, we identified five key themes for B2B IoT.

EVEN WITH GROWTH POTENTIAL, CONNECTED CAR MARKET IS OVERCROWDED

The 2025 iteration of CES featured a staggering abundance of vendors in the connected car space, aggregating the wide range of solutions and supporting technologies related to autonomous driving, (video) telematics, safety systems, infotainment, and in-vehicle commerce. The number of such companies exhibiting and attending, which we estimate was higher than last year, underscores the significant interest in revolutionizing the automotive experience as the number of connectable vehicles worldwide has grown substantially.

Most connected car technologies fall into specific categories. Examples include sensors and data collection (such as lidar, radar, and computer vision), autonomous vehicle operation (such as artificial intelligence, machine learning and control systems), and digital engagement. While there's a need for all three categories, it was evident that the number of vendors

offering similar or overlapping solutions is much higher than the market requires given the limited number of vehicle manufacturers.

We think this means only a handful of players will survive and thrive: We think most vendors, being small and overly focused on development relative to go-to-market strategy, will be absorbed by larger organizations or fade into obscurity (if they don't go bankrupt). The market only needs a few leaders in each category to support the broader connected car ecosystem. This means existing and prospective investors face a high risk of loss, particularly given these business's high capital needs.

Our conversations suggest industry consolidation is already underway and set to accelerate. As connected car technology matures and demand stabilizes, we think only the most robust and scalable solutions will thrive. Investors are likely to focus on those companies that can differentiate themselves and demonstrate long-term viability. We think companies that feature unique competitive advantages, particularly in more innovative areas such as computer vision and artificial intelligence (AI), will sustain growth and become preferred targets for strategic partnerships and acquisitions.

These conditions are driving a trend toward hybrid offerings that combine several technologies under one roof to create integrated, all-in-one solutions. This could be a key to surviving in this competitive market. As autonomous driving technology continues to evolve, we think only a few vendors will become true leaders of the connected car revolution, driving the market forward as the industry matures.

VALUE OF IN-CAR PAYMENTS UNCLEAR, SO ADOPTION IS UNCERTAIN

Unlike last year, many companies this year showcased in-car payments in hopes of driving awareness and interest. Among them were **Mavi.io**, **Sheeva**, **Starfish** and **Verra Mobility**.

mavi.io

SHEEVA

starfish^{*}

Payment Full-Stack In-Car Payment Payment Orchestration

VERRA MOBILITY[™]

In-car payment technology, which essentially transforms cars into smartphones on wheels, enables drivers and passengers to search, select and buy products and services directly through vehicles, often by using in-console touch screens and embedded connectivity. They extend beyond paying for tolls and parking to many other use cases, such as reserving EV charging times, enabling

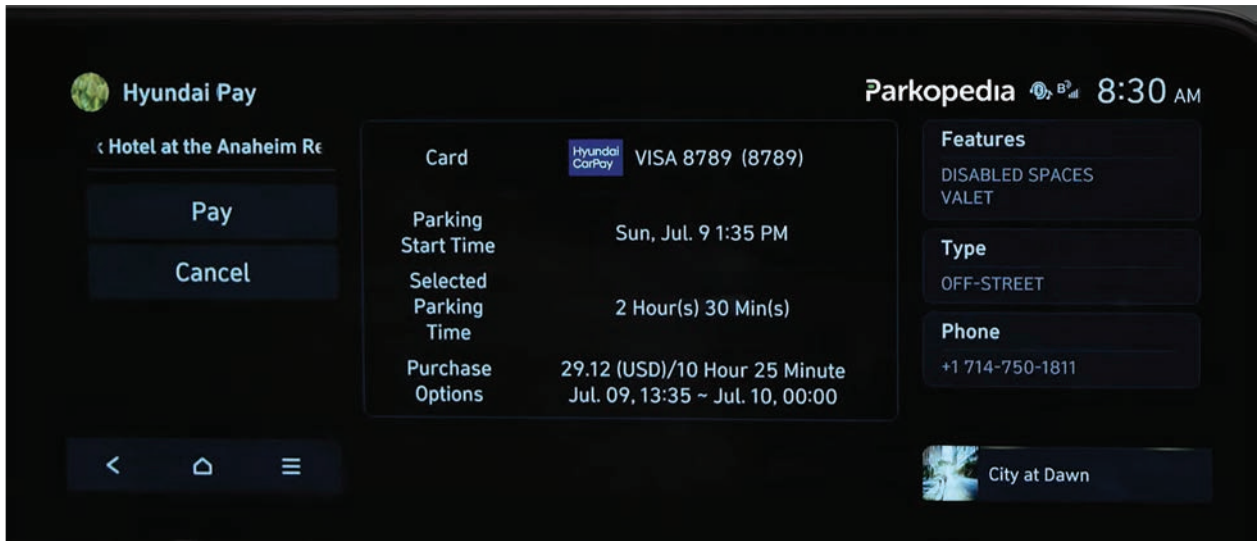
vehicle occupants to explore restaurant options, search for and buy products at convenience stores and gas stations so they're ready for pickup on arrival, and make reservations. We expect to see additional use cases, including grocery ordering and commercial vehicle delivery zone reservation.

We think in-car payment is a logical use of vehicles' embedded connectivity and digital capabilities and a natural part of software-defined vehicle (SDV) evolution. The concept makes most sense, in our view, for activities that are clearly vehicle related, such as paying tolls, reserving EV spots and paying for parking, and paying for car washes. We think these solutions will see the greatest adoption because they're straightforward and efficient and save time for drivers.

In-vehicle payment sample use cases

Source: Sheeva.AI.

Purchasing parking through the vehicle console



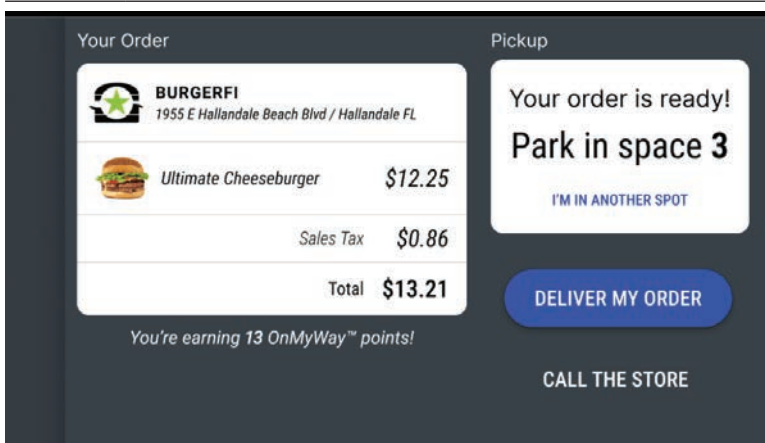
Source: Hyundai.

However, much of the in-car payment buzz is around promoting food and restaurant purchases. While this is innovative and aligns with the broader vehicle-to-infrastructure trend (V2X; cars communicating seamlessly with their surroundings), we question the value proposition. The problem is virtually everyone carries a smartphone that can do the same things, and it's unclear why

consumers should (or would) use in-vehicle payment systems instead of their smartphones, particularly given smartphones offer location services and are often more intuitive, offer better control, save digital preferences and increasingly act as digital wallets. Further, most modern vehicles pair with smartphones via Bluetooth, bringing smartphones' commerce functionality directly into the vehicle. Finally, it seems dubious to think drivers can safely use vehicles' search, carting and payment systems while driving. While passengers might be able to use the systems, that would limit the size of the opportunity, and it is hard to imagine parking and toll use cases alone can drive widespread adoption of in-car payments.

That said, we anticipate a few of the in-car payment companies will overcome these challenges with offerings that safely engage drivers while delivering real value, for example, by using voice-driven applications for hands-free commerce and AI-based agents to engage drivers, answer questions, and make purchases.

OnMyWay Commerce



Source: Mavi.io.

MORE INTEREST IN ENERGY HARVESTING, BUT VENDORS NEED TO EVANGELIZE WITH PRODUCTS

We highlighted energy harvesting in our [2024 CES recap](#) as one of the material burgeoning trends in the IoT space. Energy harvesting collects energy from ambient sources including light, motion, radio signals, and heat (thermal), among other creative sources. Each source is suitable for different application power needs. Incorporating energy harvesting in IoT hardware eliminates or reduces the need for batteries (making them “battery-less”) or line power, especially for hardware attached to unpowered assets. This can yield substantial savings in the form of reducing or eliminating the cost of buying and replacing batteries at numerous dispersed sites. Further, with an improved power source, vendors can afford to collect and report data in volumes and at frequencies that were previously impractical, improving asset visibility and increasing overall solution value. For

these reasons, we continue to be bullish on energy harvesting technology and applications that leverage it thoughtfully, as we expect both enablers and hardware providers to see strong adoption.

We spoke with many of the same energy harvesting companies that exhibited or attended last year as well as first-time participants. These included **WePower Technologies** (kinetic energy harvesting), **Powercast** and **AeroCharge** (radio signal energy harvesting), **Perovskia Solar** and **Dracula Technologies** (ambient light harvesting), and **e-peas** (provider of energy management solutions that are agnostic to the underlying energy harvesting technology).

It appears the energy harvesting trend is continuing to grow, as each of these companies indicated interest in energy harvesting has increased relative to last year. They’re seeing more inbound inquiries from wireless device companies (standalone and full-solution), more proof-of-concept projects, and more conversations exploring potential partnerships. In addition, we spoke with several IoT hardware and solution companies that said using or researching energy harvesting options is a priority, often at the behest of their customers.

Radio frequency (RF) power



Source: Powercast.

Nonetheless, we think it will be at least a few more years before energy harvesting becomes mainstream. Most energy harvesting enablers, despite showcasing use cases with complete products, are focused on licensing their technology to hardware and full-solution companies, rather than building end-user products or components. Licensing works well with high-volume original equipment manufacturer (OEM) use cases that can drive visibility and adoption, but this takes time. In our view, energy harvesting players are better served by contracting to manufacture their own products while remaining open to licensing their technology to partner prospects when request-



Kinetic energy module



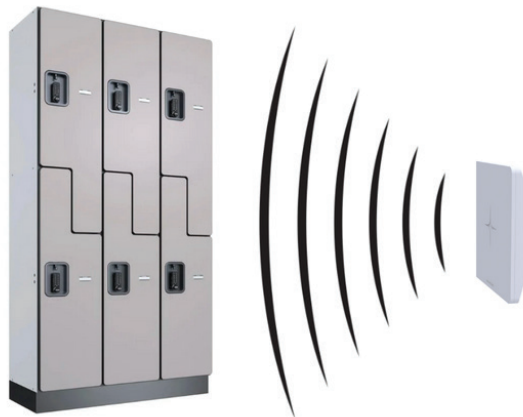
Wireless battery-free leak detector



Source: WePower Technologies.

ed. Further, vendors need to evangelize energy harvesting outside of conferences and shows with finished products to further drive awareness and visibility, prove the technology is maturing (it works), and show momentum toward adoption to create a sense of urgency among IoT hardware and solution companies. Vendors also need to provide the core enabling components so IoT hardware providers can incorporate the technology in their existing products and expedite time to market while minimizing risk and upfront investment in design and production for energy harvesting strategies. Until this happens and despite some evidence of traction, we think IoT hardware and full-solution providers will be slow to advance energy harvesting.

RF power for smart lockers



Source: AeroCharge.

REMOTE OPERATION BY HUMANS LIKELY TO BECOME COMMON

Most IoT solutions fall into one of two broad categories 1) those that provide remote visibility into asset or environmental conditions with sensor data and 2) those that enable remote control by humans over wireless networks (teleoperation) through actuators and other components. Some offerings straddle both categories. Teleoperation is relatively uncommon today. Remotely operating assets such as vehicles, heavy equipment, drones and robots requires reliable, high-speed communication technology to ensure safety. Even small communication lags – seconds or milliseconds – mean loss of control over moving assets that can result in property damage, injuries and fatalities. Until now, the requisite real-time communication capabilities (reliable with ultra-low latency and high data throughput) have been either unavailable or too expensive. This contrasts with visibility solutions, which typically can work with near-real-time or even lagged data and still deliver strong return on investment.

But our conversations suggest teleoperation is about to become much more common for several reasons. First, real-time communication has improved and continues to improve with the ongoing rollout of 5G networks that are faster and more reliable and have greater data capacity. Second, the rise of edge computing (data processing) and advanced data compression is reducing overall latency and the amount of data that needs to be moved remotely. Third, backup networks, including satellite, are more abundant, so remote control systems can quickly switch networks when needed.

With these advances, we expect to see more solutions for remotely piloting ground and air vehicles, such as cars, trucks, trains, robots and drones. Examples include remote valet technology for parking, taxis, food and product delivery, inspection, and yard shunting. We expect

Teleoperation sample use cases



Remote Valet

- Find parking, Retrieve car
- Recharging, Refueling
- Check-ups, Cleaning



Remote Chauffeur

- Drive me, I'm tired
- Family rides
- Airport pickup



Remote Ops

- Construction
- Yard shunting
- Autonomy backup

Source: Ottopia.

to see some providers focus on continuous teleoperation and others support exception-based fail-safe teleoperation (assuming remote control of autonomous assets in emergencies or other unusual situations).

We expect this latter approach, deemed autonomy backup, to become an industry standard for all autonomous programs. High-profile autonomous vehicle crashes and fatalities have led to public backlash and loss of confidence in autonomous technology. Autonomy backup via human remote control addresses these concerns. In this context, we think one company to watch is **Ottopia**, which provides both continuous and backup teleopera-

tion for the autonomous vehicle market. It believes that as its technology advances, with triggering capabilities becoming more refined, each of its remote human operators will be able to handle more vehicles, enabling its solution to scale.

ottopia

SOFTWARE AND HARDWARE COMPANIES SHOW SURPRISING INTEREST IN ACQUIRING MVNO ASSETS

We examined the mobile virtual network operator (MVNO) space in detail in our [October 2024 white paper](#). In that report, we underscored the commodity nature of connectivity alone. We pointed out that in order to differentiate and thrive, MVNOs need to offer complementary technologies such as device management, network management, billing software and security software or implement alternative strategies such as creative pricing, value-chain bundling, and vertical specialization. We expect MVNOs to do so via acquisitions, partnerships and targeted strategic changes. Several MVNOs at CES 2025 voiced their agreement with our thesis and said they're planning

Teleoperation



Source: Ottopia.

to make such changes. We also heard a handful of IoT companies across the IoT value chain say they plan to acquire MVNOs to bundle data services with their existing businesses. These players each represented a different part of the IoT value chain. Examples included infrastructure software providers (such as device management software), end-user application providers, and proprietary hardware providers.

Whether an MVNO acquires IoT providers or the reverse, the goal is essentially the same: Deliver more value to existing and prospective customers by being a one-stop shop, thereby increasing revenue and customer stickiness. The starting point matters, however. MVNOs, even many with advanced capabilities, generally have lower gross margins than IoT providers, so it makes sense for MVNOs to acquire other components in the IoT value chain. Those other components – even enabling hardware – typically have higher margins and, when paired with an effective sales motion, enable MVNOs to improve their financial profiles and boost enterprise value.

The converse is usually true when proprietary software or hardware companies purchase MVNOs, as their higher margins become diluted by connectivity services and push their valuation multiples lower. For this reason, we find it surprising to see seemingly broad inter-

est among IoT companies in acquiring connectivity. We surmise these IoT companies are seeking much greater revenue scale and visibility. Large-scale, highly visible IoT companies remain scarce relative to the number of large, visible MVNOs. We think IoT companies pursuing MVNO strategies are wagering they can overcome connectivity's margin pressure with greater absolute profit and enhanced go-to-market strategies as their newly acquired connectivity offerings boost sales of their core software, hardware and solutions. It will be interesting to see how it plays out. The overpopulated MVNO market was already consolidating; we expect IoT companies' interest in acquiring connectivity to accelerate the pace of MVNO acquisitions in the near term (and drive MVNO valuations higher).

LOOKING AHEAD TO MORE CES

In our view, CES remains a prime forum for IoT companies, providing perspective and (sometimes) clarity on the key evolving trends in the immense and dynamic IoT ecosystem. Based on another year of enlightening and productive conversations at and following CES 2025, we look forward to engaging around future CES shows to further build our IoT thought leadership.

IoT index gains in line with market

The First Analysis Internet of Things Index ended the one-year period through March 3 up 12.1%. It only modestly underperformed the Nasdaq's 13.2% increase and the S&P 500's 14.0% increase. With the exception of June 2024, the index moved mostly in line with the broader markets over the past year.

While the IoT index's gain was once again nearly all due to one company (Samsara, IOT), 11 of the 18 IoT index constituents

that were publicly traded a year ago were up over the period (versus 13 that were up in our October report), led by Inseego (INSG) with a 195% gain and followed by Franklin Wireless (FKWL) with a 136% gain. Samsara, which comprised 37% of the index's total market capitalization at the beginning of the period, contributed 10 points to the index's performance.

Internet of Things public comparables*

(\$ in millions)

Company	LTM revenue	Revenue growth		LTM gross margin	LTM EBITDA margin	Enterprise value /			
		2023A-2024E ²	2024E-2025E			Revenue		EBITDA ¹	
						2024E ²	2025E	2024E ²	2025E
Airgain (AIRG)	\$60.6	8.2%	(0.7%)	40.9%	(8.8%)	0.88x	0.89x	NMF	NMF
Alarm.com (ALRM)	\$939.8	6.6%	4.2%	65.3%	13.9%	2.95x	2.83x	15.9x	14.6x
Arlo Technologies (ARLO)	\$510.9	4.0%	2.2%	36.7%	(5.7%)	2.19x	2.14x	26.9x	17.8x
Digi International (DGII)	\$421.8	(4.5%)	1.2%	60.9%	19.7%	2.76x	2.73x	11.7x	11.7x
Franklin Wireless (FKWL)	\$43.4	(8.4%)	0.0%	14.9%	(5.5%)	0.94x	NMF	NMF	NMF
Impinj (PI)	\$366.1	19.1%	(5.0%)	51.6%	2.8%	7.19x	7.57x	NMF	NMF
Inseego (INSG)	\$191.2	14.3%	0.5%	36.0%	2.9%	0.86x	0.85x	7.6x	7.2x
Ituran Location and Control (ITRN)	\$336.3	5.1%	6.7%	47.8%	27.1%	2.16x	2.02x	7.9x	7.6x
Karoo (KARO)	\$238.7	9.9%	11.8%	68.8%	40.1%	5.63x	5.04x	13.3x	12.1x
KORE Group (KORE)	\$285.2	2.3%	4.9%	54.5%	7.4%	1.67x	1.59x	8.6x	7.3x
Lantronix (LTRX)	\$155.8	12.9%	(18.7%)	40.4%	3.7%	0.66x	0.82x	6.9x	8.3x
Napco Security Tech. (NSSC)	\$186.5	5.1%	2.8%	56.4%	29.7%	4.10x	3.99x	13.2x	13.9x
PowerFleet (PWFL)	\$293.0	119.1%	47.0%	52.6%	4.7%	3.73x	2.54x	24.9x	10.2x
Samsara (IOT)	\$1,179.2	32.2%	23.3%	75.7%	(17.5%)	20.09x	16.29x	NMF	NMF
ServiceTitan (TTAN)	\$724.4	24.2%	15.9%	65.5%	(8.6%)	13.28x	11.45x	NMF	NMF
SmartRent (SMRT)	\$199.8	(24.6%)	2.6%	33.6%	(13.7%)	0.49x	0.48x	NMF	NMF
Trimble (TRMB)	\$3,683.3	(3.0%)	(6.8%)	67.7%	19.3%	4.86x	5.21x	18.1x	18.4x
Tuya (TUYA)	\$298.6	29.8%	20.0%	47.4%	(14.4%)	3.54x	2.95x	NMF	25.8x
Verra Mobility (VRRM)	\$879.2	7.6%	5.9%	61.1%	38.9%	5.29x	5.00x	11.6x	11.3x
Average	\$578.6	13.7%	6.2%	51.5%	7.2%	4.38x	4.13x	13.9x	12.8x
Median	\$298.6	7.6%	2.8%	52.6%	3.7%	2.95x	2.78x	12.4x	11.7x

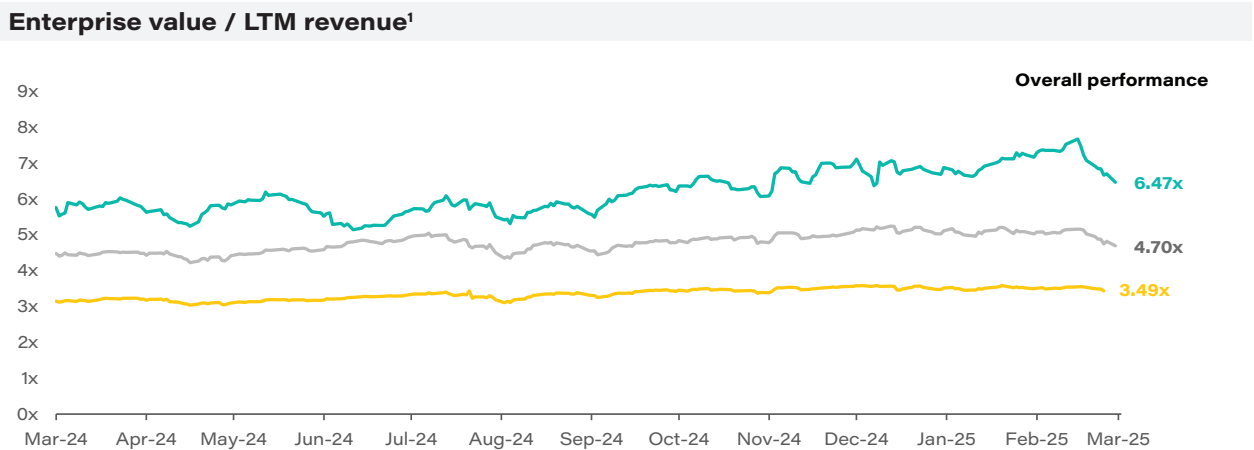
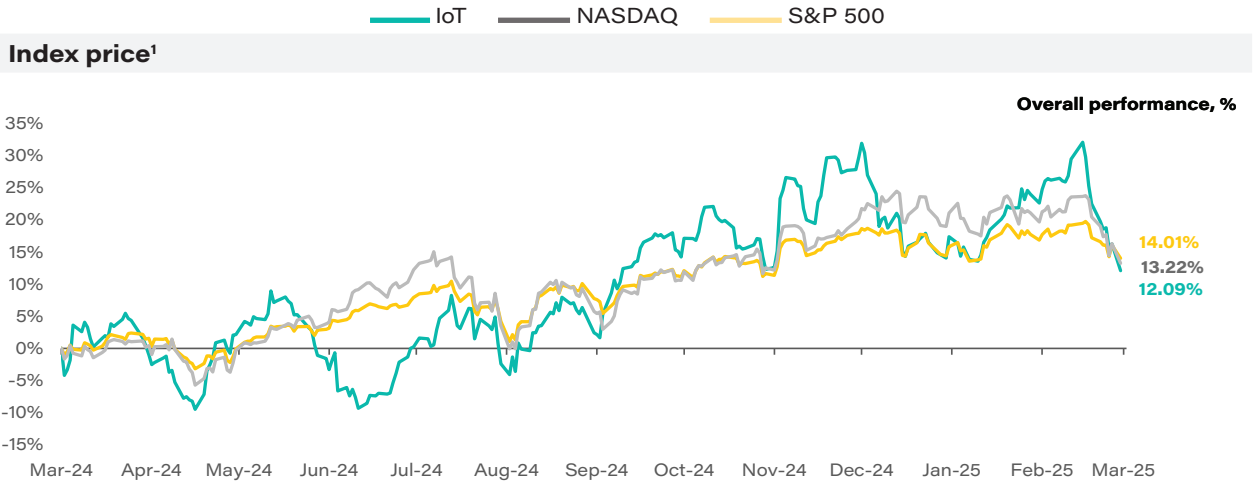
Source: Capital IQ, First Analysis.

Notes: * Public comparable company data shown above is as of March 3, 2025.

(1) EBITDA multiples less than 0 and greater than 35 labeled "not meaningful" (NMF). LTM = last 12 months. EBITDA = earnings before interest, taxes, depreciation and amortization.

(2) Figures shown are estimated for companies that as of March 3, 2025, had not reported results corresponding to the 2024 calendar year.

First Analysis Internet of Things Index 1-year performance



Source: Capital IQ.

Notes: (1) Index performance is weighted by market cap. For the period from March 4, 2024, through March 3, 2025.

The average IoT market-cap-weighted enterprise value multiple of trailing 12-month revenue ended the period at 6.5, up from 5.8 at the beginning of the period. The average enterprise value multiple of 2025 estimated revenue was 4.1 as of March 3 (median 2.8). The average expected 2025 revenue growth rate was 6.2% as of March 3, much lower

than 2024's 13.7% revenue growth figure (which reflects actual results for companies that had reported by March 3).

The metrics above for the current period reflect the addition of ServiceTitan (TTAN), which had its initial public offering in December. The company provides software that helps commercial and residential contractors run their businesses, often by enabling integrations with IoT technology.

IoT M&A: Notable transactions include Zonar, CHeKT, Preteckt

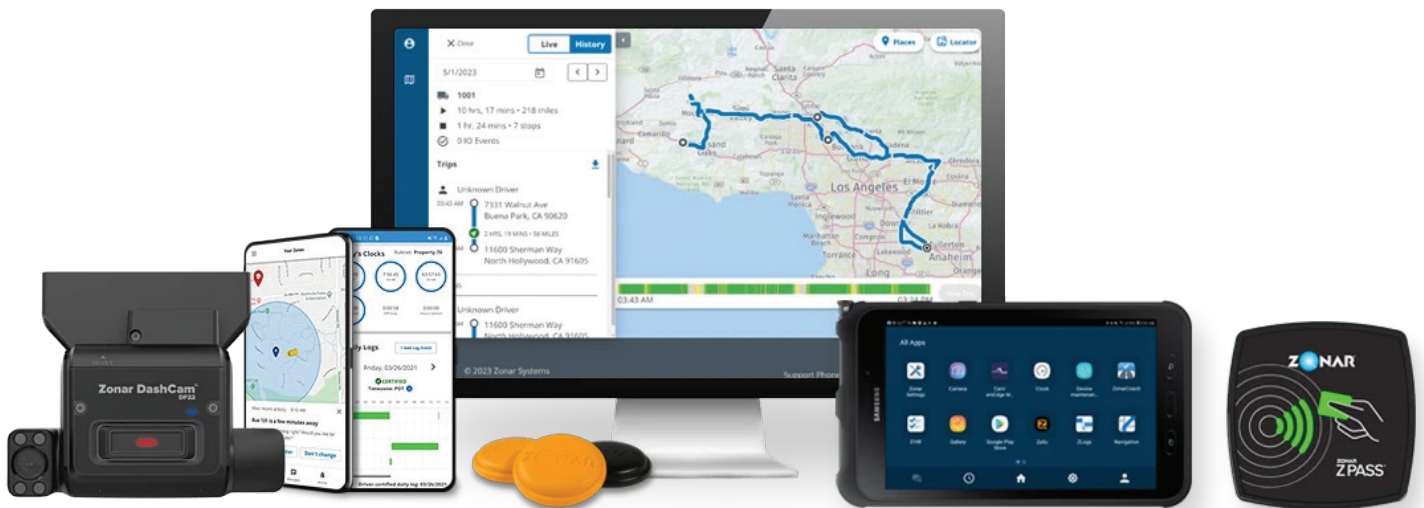
We highlight three noteworthy IoT merger and acquisition transactions since our last report.

In early December, GPS Trackit, backed by Inverness Graham, announced it acquired Zonar Systems for an undisclosed amount. Zonar provides fleet management solutions, particularly in the government and education sectors. Zonar's advanced telematics and compliance tools for fleet management strengthen GPS Trackit's position as a provider of

telematics and cloud-based solutions for fleets of all sizes across the commercial, field services and passenger industries.

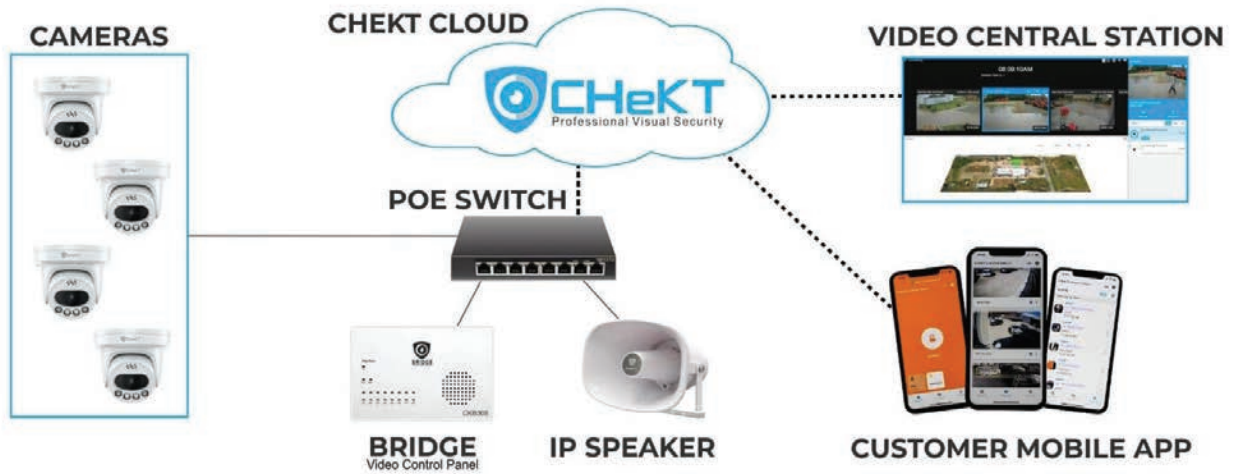
In February, Alarm.com (ALRM) announced it acquired CHeKT, a cloud platform for remote video monitoring (RVM) services. CHeKT's platform includes subscription-based RVM services that enable central monitoring stations and service providers to deliver high-value security solutions to commercial and residential customers. By combining

Zonar smart fleet management solutions



Source: Zonar Systems

CHeKT visual security installation



Source: CHeKT.

CHeKT's monitoring technology with its own smart home solutions, Alarm.com seeks to expand its commercial portfolio, offering businesses more comprehensive, scalable and secure systems for managing their properties while increasing operational efficiency and safety. Terms of the transaction were not disclosed.

Also in February, Diesel Laptops announced it had acquired Preteckt, which specializes in predictive maintenance for the transit and coach bus sector. Diesel Laptops, which provides diesel diagnostic tools, repair information, and techni-

cian training, plans to extend Preteckt's technology into additional markets. By integrating Preteckt's advanced artificial intelligence technology, machine learning, and predictive maintenance into Diesel's offerings, Diesel plans to bring real-time monitoring and proactive repair planning to the entire commercial trucking industry to reduce downtime for fleet operators and enhance fleet efficiency.



Select recent M&A transactions (sorted by date of announcement)

(\$ in millions)

Date	Target	Target business description	Buyer	Enterprise value	Enterprise value/rev
02/25/2025	Silver Fern Group Services	Software, data analytics, and custom solutions designed to enhance the efficiency and productivity of horticulture businesses	Advanced Grower Solutions	Undisclosed	Undisclosed
02/21/2025	PumpAlarm.com	Cellular water alarms	DriBot	Undisclosed	Undisclosed
02/14/2025	RA-COMM	Two-way radio communication solutions for police departments, fire departments, and emergency services	Mobile Communications America	Undisclosed	Undisclosed
02/14/2025	IRT Technologies	Satellite radio frequency systems and products	ETL Systems	Undisclosed	Undisclosed
02/11/2025	CHeKT	Cloud platform for remote video monitoring (RVM) services	Alarm.com (ALRM)	Undisclosed	Undisclosed
02/10/2025	Preteckt	Predictive maintenance systems for the transit and coach bus sector	Diesel Laptops	Undisclosed	Undisclosed
01/14/2025	Lumin	Energy manager and energy storage system and platform	ABB	Undisclosed	Undisclosed
01/07/2025	Enel X North America	Energy management and storage solutions	VoltiE Group	Undisclosed	Undisclosed
12/23/2024	Mingothings	Integrated IoT solutions and data analytics for smart cities and connected industries	OneMind Technologies	Undisclosed	Undisclosed
12/18/2024	Fend	Cloud-based monitoring equipment	Opswat	Undisclosed	Undisclosed
12/18/2024	VOXX International (VOXX)	Automotive electronics, consumer electronics, and biometric products	Gentex (GNTX)	\$160.1	0.4x
12/16/2024	IoTerop	IoT device management software	Trasna Solutions	Undisclosed	Undisclosed
12/12/2024	Machfu	Industrial IoT software for analytics and visualization on mobile tablets and computers	New Asia Holdings	\$1.2	Undisclosed
12/10/2024	Next Era	Distributor of 4G/5G/mobile networks and critical communications	Capestone	Undisclosed	Undisclosed
12/03/2024	Zonar Systems	Telematics and compliance tools for fleet management	GPS Trackit	Undisclosed	Undisclosed
11/09/2024	Hardware and software services business of Borqs Technologies	Android-based smart connected devices and cloud service solutions	Sasken	Undisclosed	Undisclosed
11/07/2024	Enterprise IIoT Solutions portfolio of NetComm Wireless	Industrial IoT solutions	Lantronix (LTRX)	\$6.5	Undisclosed
11/04/2024	Shyft Power Solutions	Integrated hardware and software platform that allows homes and businesses in to monitor, manage, and control all power sources from a mobile application	Steam Company	Undisclosed	Undisclosed
10/31/2024	TWTG	Information technology research and engineering platform designed for industrial IoT	IMI	\$27.1	Undisclosed
10/30/2024	Everynet	Neutral host low power wide area networks in major geographies around the globe	Netmore	Undisclosed	Undisclosed
10/30/2024	Altair Engineering (ALTR)	Software and cloud solutions for simulation, high-performance computing, data analytics, and artificial intelligence in the U.S. and internationally	Siemens Product Lifecycle Management Software	\$10,187.5	15.8x
10/07/2024	Barnes Group	Engineered products, industrial technologies, and solutions	Apollo Global	\$3,547.4	2.2x

Select recent M&A transactions *(sorted by date of announcement)**(\$ in millions)*

Date	Target	Target business description	Buyer	Enterprise value	Enterprise value/rev
10/07/2024	Space-based technologies, assets and business operations of Quantum Generative Materials	Orbital imaging and remote sensing satellite, mission control software, related low-Earth orbit assets, contracts to manage third-party satellites	StarVasa	Undisclosed	Undisclosed
10/02/2024	Global Telematics	Telematics software for various industries	Valsoft	Undisclosed	Undisclosed
10/01/2024	IntelliVision	Intelligent video analytics, video content analysis, and automated surveillance solutions	Nipun Vision	Undisclosed	Undisclosed

Source: Capital IQ, First Analysis.

IoT private placements: Notable transactions include 75F, Netradyne, SuperAnnotate

We highlight three noteworthy IoT private placements since our last report.

In November, SuperAnnotate announced a \$36 million Series B funding led by Socium Ventures with participation from Nvidia (NVDA), Databricks Ventures, Play Time Ventures and Glynn Capital. SuperAnnotate automates data annotation processes and enables machine

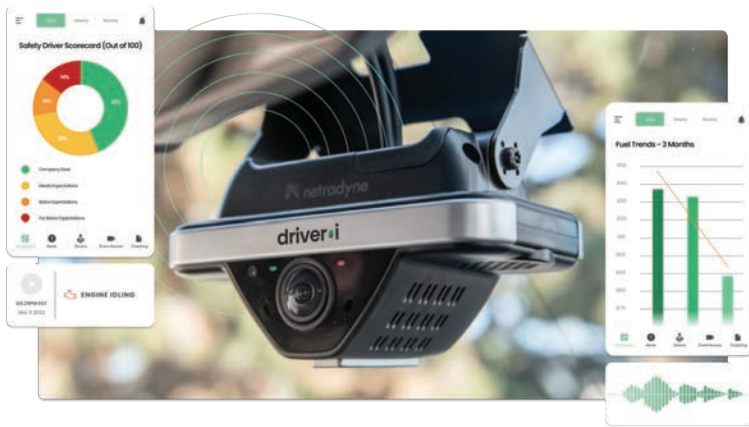
learning teams to efficiently train artificial intelligence (AI) models. With its origins in image segmentation to enable pixel-precise annotation in computer vision applications, the company now supports AI solutions in areas including agriculture, healthcare, autonomous driving, robotics, natural language processing, and security and surveillance. With this

Finding the right annotation workforce



Source: SuperAnnotate AI Inc.

Netrodyne's smart dashcams



Source: Netrodyne.

funding, SuperAnnotate plans to expand its product suite and invest in research and development.

In January, Netrodyne, a provider of AI-powered fleet safety and telematics solutions, announced a \$90 million Series D funding led by Point72 Private Investments with participation from Qualcomm Ventures and Pavilion Capital. The funding will support research and development, go-to-market strategy, and global

expansion. Netrodyne's platform uses deep learning and computer vision technology to improve driver behavior and reduce fleet accidents. It analyzes 100% of drive-time data, identifying both positive and negative driving behaviors and enabling effective in-cab coaching. In addition to promoting safer driving, these capabilities help fleets shield drivers from false claims, minimize collisions and insurance costs, optimize productivity, and simplify compliance management.

In early February, 75F, which provides building automation and energy efficiency solutions, announced a \$45 million Series B funding. The investment was led by Accurant International with participation from Carrier Global (CARR), OGC Climate Investments, Breakthrough Energy Ventures, Next47, and Wind Ventures. 75F's IoT-powered solutions help optimize energy usage, improve indoor air quality, and increase occupant comfort in commercial buildings. By offering hardware and software in an affordable solution, 75F aims to expand energy-saving technologies beyond premium office spaces to a broader range of commercial properties.

75F product suite



Source: 75F.

Select recent private placements (sorted by date of announcement)

(\$ in millions)

Date	Company	Business description	Investors	Raise type	Amount raised	Total amount raised
2/24/2025	Safetrust	Mobile credential solutions	Dormakaba	Growth	Undisclosed	Undisclosed
2/19/2025	Probus Smart Things	IoT solution for electricity distribution utilities enabling smart grid automation	Unicorn India Ventures Advisors	Venture	\$5.0	Undisclosed
2/13/2025	Teneo Protocol	Blockchain platform for systems including IoT devices and machine data	Advanced Blockchain; Outlier Ventures; RockawayX; Borderless Capital; Moonrock Capital; Token Ventures; Generative Ventures; X Ventures; EoT Ventures	Seed	\$3.0	\$3.0
2/12/2025	High Definition Vehicle Insurance	Software and telematics for commercial auto insurance products	8VC; Weatherford Capital; AutoTech Ventures; Munich Re Ventures	Growth	\$40.0	\$87.5
2/11/2025	Virtual Peaker	Cloud-based energy management platform that allows utility companies to control web-enabled appliances	Emerson Ventures; Moore Strategic Ventures; Greensoil PropTech Ventures; Susquehanna Sustainable Investments	Growth	Undisclosed	Undisclosed
2/10/2025	Trackunit	Telematics solutions for all sizes of fleets across a range of industries	HgCapital; Goldman Sachs	Series A	Undisclosed	Undisclosed
2/6/2025	75F	Building automation and energy efficiency solutions	Carrier Global (CARR); WIND Ventures; Next47; OGCI Climate Investments; Accurant International	Series B	\$45.0	\$72.9
2/6/2025	Wi2Wi	Wireless connectivity solutions, precision timing devices, frequency control products, and microwave filters	Undisclosed	PIPE	\$0.5	NA
2/4/2025	AtomBeam Technologies	Data compaction software for IoT applications	Crowdfunded	Growth	\$20.0	\$35.0
1/31/2025	Appronik	Electric actuators, real-time control systems, education and training tools, and human-centered robotics	Alphabet (GOOG); Capital Factory; B Capital	Series A	\$350.0	\$379.7
1/28/2025	Bonsai Robotics	Vision-based autonomous solutions for harsh environments, particularly in agriculture	Serra Ventures; Cibus Capital; Fall Line Capital; E14 Fund; Acre Venture Partners; Congruent Ventures; SNR Ventures; Bison Ventures	Series A	\$15.0	\$25.5
1/28/2025	Roofr	Satellite imagery software that analyzes roofs for replacement and repair needs	CrossLink Capital; TCMI; American Builders & Contractors Supply; I2BF Global Ventures; Euclid Ventures	Series B	Undisclosed	Undisclosed
1/27/2025	Agentuity	Cloud infrastructure platform designed to deploy, manage, and scale artificial intelligence agents autonomously	Southern Equity Partners; BOLDstart Ventures; Bloomberg Beta; OneSix-One Ventures	Seed	\$4.0	\$4.0
1/23/2025	Blackline Safety	Worker safety monitoring products and services	DAK Investments; Lowy Family Group	PIPE	\$18.8	NA
1/23/2025	Baya Systems	Modular semiconductor technologies that are chiplet-ready, enabling intelligent computing across various sectors	Matrix; Synopsys (SNPS); Intel Capital; Maverick Silicon	Series B	\$36.0	Undisclosed

Select recent private placements (sorted by date of announcement)

(\$ in millions)

Date	Company	Business description	Investors	Raise type	Amount raised	Total amount raised
1/21/2025	Gravity Climate	Carbon and energy management platform that ingests, calculates, and distributes key emissions data about businesses	Caffeinated Capital; Eclipse Ventures; Comunitas Capital Partners; HNVR Technology; Buoyant Ventures; Ansa Capital; WEX Venture Capital	Series A	\$13.0	\$13.0
1/16/2025	Zededa	Edge virtualization software to deliver visibility, control, and protection for IoT edge gateways, applications, and networks	Aramco Ventures; Abu Dhabi Developmental Holding Company	Growth	Undisclosed	Undisclosed
1/9/2025	Valiot	AI software for smart manufacturing	FEMSA Ventures; Angeles Ventures	Growth	\$3.4	\$8.7
1/6/2025	Edgecom Energy	Energy management platform to improve energy efficiency	ABB Technology Ventures; GreenSky Ventures	Seed	\$1.7	\$1.7
12/31/2024	Airspan Networks	Wireless network equipment for 4G and 5G networks for mainstream public telecommunications service providers and private network implementations	Fortress Investment Group	Growth	Undisclosed	Undisclosed
12/27/2024	Clear Blue Technologies	Off-grid power solutions for powering, controlling, monitoring, managing, and servicing solar and hybrid powered systems	Undisclosed	PIPE	\$6.1	NA
12/26/2024	Netradyne	AI-powered fleet safety and telematics solutions	Point72 Private Investments; Qualcomm Ventures; Pavilion Capital Partners	Series D	\$90.0	Undisclosed
12/19/2024	Macom Technology Solutions (MTSI)	Analog semiconductor solutions for use in wireless and wireline applications across the radio frequency, microwave, millimeter wave, and lightwave spectrum	Undisclosed	PIPE	\$55.5	NA
12/16/2024	Legend Power Systems	Onsite energy management technology	Undisclosed	PIPE	\$1.1	NA
12/12/2024	Nanoramic	Energy storage company that designs, manufactures, and licenses core electrodes, ultracapacitors, and thermal interface gap filler pads	Samsung Ventures; Fortistar; General Motors Ventures; WindSail Capital; TSM; Catalus Capital	Growth	\$44.0	Undisclosed
12/7/2024	Schwarm Technologies	IoT platform for energy sector data analytics and energy management	Undisclosed	Growth	\$3.0	\$3.0
12/3/2024	SuperFi Labs	Decentralized network infrastructure platform	SNZ; Linklogis; ByteTrade Lab; Taiko Labs	Pre-Series A	\$2.5	\$2.5
12/3/2024	Eagle Electronics	Electronics and cellular module production	Asymmetric Capital Partners; The O.H.I.O. Fund	Venture	\$14.0	\$14.0
12/2/2024	Veeva (VEEA)	Computing, multiaccess multiprotocol communications, edge storage, and cybersecurity solutions	White Lion Capital	PIPE	\$25.0	NA
12/2/2024	Intuitive Machines (LUNR)	Space systems and space infrastructure for the moon	Boryung	PIPE	\$10.0	NA
11/29/2024	Aerkomm	Satellite communication technology	G-TECH Optoelectronics	PIPE	\$2.4	NA
11/27/2024	CRWN.ai	IoT and AI to provide real-time insights into the condition of transmission systems for utilities	B.C. Centre for Innovation and Clean Energy	Venture	Undisclosed	Undisclosed

Select recent private placements (sorted by date of announcement)

(\$ in millions)

Date	Company	Business description	Investors	Raise type	Amount raised	Total amount raised
11/26/2024	Ikin Global	4G GPS truck locks, smart reusable bolt seals, smart shutter locks and smart padlocks	Unicorn India Ventures; Callapina Capital	Venture	\$1.0	Undisclosed
11/26/2024	Wherobots	Geospatial data and computer vision analysis software	Felicis Ventures; Wing Ventures; JetBlue Technology Ventures; Clear Ventures Management; Aramco Ventures	Series A	\$21.5	\$27.0
11/20/2024	Mapped	AI-based data infrastructure for commercial and industrial IoT	NTT Docomo Ventures	Growth	Undisclosed	Undisclosed
11/13/2024	Lunar Outpost	Space robotics for the lunar surface	Promus Ventures; Type One Ventures; Lafayette Square	Series A	Undisclosed	Undisclosed
11/6/2024	Digital Ally (DGLY)	Digital video imaging and storage and related products for use in law enforcement, security, and commercial applications	Undisclosed	PIPE	\$6.6	NA
10/29/2024	Spot AI	AI-based camera system to help businesses operate based on visual context	Redpoint; Scale; Qualcomm Ventures; Step-Stone Group; Cheyenne Partners; Milk Street Ventures; Modern Venture Partners; GSBackers	Growth	\$31.0	\$94.6
10/29/2024	Globalstar (GSAT)	Mobile satellite services	Apple (AAPL)	PIPE	\$1,500.0	NA
10/29/2024	Lifesaver Mobile	App for drivers that auto-detects driving and blocks phone use on the road	Jamf Ventures	Growth	Undisclosed	Undisclosed
10/29/2024	Super Annotate AI	Data annotation technology for computer vision applications supporting AI solutions in areas including agriculture, healthcare, autonomous driving, robotics, natural language processing, and security and surveillance	Socium Ventures; Nvidia (NVDA); Databricks Ventures; Play Time Ventures; Glynn Capital	Series B	\$36.0	\$67.9
10/28/2024	Orbital Sidekick	Hyperspectral sensors to provide aerial asset monitoring for energy companies and the government sector	Undisclosed	Growth	\$8.6	\$54.9
10/25/2024	Delta Electronics	Power and thermal management solutions	Det International	Growth	\$10.0	\$32.0
10/24/2024	Momentus (MNTS)	Commercial space company	Space Infrastructures Ventures	PIPE	\$3.0	NA
10/17/2024	Talkingheads Wireless	Network towers and cellular telecommunications equipment designed to provide a sustainable 5th-generation network	Undisclosed	Venture	\$4.9	\$4.9
10/10/2024	FirstLight Fiber	Fiber-based communication networks	Sixth Street Partners; Palistar Capital	Growth	\$120.0	\$120.0
10/7/2024	Eigen Innovations	Quality inspection and process control solutions for industrial manufacturers	BDC Capital; Momenta Ventures	Growth	\$2.6	\$8.0
10/1/2024	Smith Micro Software (SMSI)	White-label mobile tracking, monitoring, and communication solutions	Undisclosed	PIPE	\$3.0	NA

Source: Capital IQ, First Analysis.

Internet of Things public comparables appendix*

(\$ in millions)

Company	Market cap	Enterprise value	LTM revenue	Revenue growth		LTM gross margin	LTM EBITDA margin	Enterprise value /			
				2023A-2024E ²	2024E-2025E			Revenue		EBITDA ¹	
								2024E ²	2025E	2024E ²	2025E
Airgain (AIRG)	\$58.1	\$53.5	\$60.6	8.2%	(0.7%)	40.9%	(8.8%)	0.88x	0.89x	NMF	NMF
Alarm.com (ALRM)	\$2,895.4	\$2,776.2	\$939.8	6.6%	4.2%	65.3%	13.9%	2.95x	2.83x	15.9x	14.6x
Arlo Technologies (ARLO)	\$1,244.6	\$1,117.2	\$510.9	4.0%	2.2%	36.7%	(5.7%)	2.19x	2.14x	26.9x	17.8x
Digi International (DGII)	\$1,080.8	\$1,163.4	\$421.8	(4.5%)	1.2%	60.9%	19.7%	2.76x	2.73x	11.7x	11.7x
Franklin Wireless (FKWL)	\$80.5	\$40.9	\$43.4	(8.4%)	0.0%	14.9%	(5.5%)	0.94x	NMF	NMF	NMF
Impinj (PI)	\$2,503.6	\$2,631.7	\$366.1	19.1%	(5.0%)	51.6%	2.8%	7.19x	7.57x	NMF	NMF
Inseego (INSG)	\$142.7	\$163.8	\$191.2	14.3%	0.5%	36.0%	2.9%	0.86x	0.85x	7.6x	7.2x
Ituran Location and Control (ITRN)	\$791.8	\$726.1	\$336.3	5.1%	6.7%	47.8%	27.1%	2.16x	2.02x	7.9x	7.6x
Karooooo (KARO)	\$1,360.5	\$1,344.0	\$238.7	9.9%	11.8%	68.8%	40.1%	5.63x	5.04x	13.3x	12.1x
KORE Group (KORE)	\$41.5	\$473.2	\$285.2	2.3%	4.9%	54.5%	7.4%	1.67x	1.59x	8.6x	7.3x
Lantronix (LTRX)	\$97.7	\$103.3	\$155.8	12.9%	(18.7%)	40.4%	3.7%	0.66x	0.82x	6.9x	8.3x
Napco Security Tech. (NSSC)	\$858.7	\$764.9	\$186.5	5.1%	2.8%	56.4%	29.7%	4.10x	3.99x	13.2x	13.9x
PowerFleet (PWFL)	\$846.4	\$1,094.3	\$293.0	119.1%	47.0%	52.6%	4.7%	3.73x	2.54x	24.9x	10.2x
Samsara (IOT)	\$25,714.1	\$24,887.0	\$1,179.2	32.2%	23.3%	75.7%	(17.5%)	20.09x	16.29x	NMF	NMF
ServiceTitan (TTAN)	\$8,353.8	\$10,128.2	\$724.4	24.2%	15.9%	65.5%	(8.6%)	13.28x	11.45x	NMF	NMF
SmartRent (SMRT)	\$242.6	\$87.1	\$199.8	(24.6%)	2.6%	33.6%	(13.7%)	0.49x	0.48x	NMF	NMF
Trimble (TRMB)	\$17,126.8	\$17,902.0	\$3,683.3	(3.0%)	(6.8%)	67.7%	19.3%	4.86x	5.21x	18.1x	18.4x
Tuya (TUYA)	\$1,899.4	\$1,056.2	\$298.6	29.8%	20.0%	47.4%	(14.4%)	3.54x	2.95x	NMF	25.8x
Verra Mobility (VRRM)	\$3,664.3	\$4,650.6	\$879.2	7.6%	5.9%	61.1%	38.9%	5.29x	5.00x	11.6x	11.3x
Average	\$3,631.8	\$3,745.5	\$578.6	13.7%	6.2%	51.5%	7.2%	4.38x	4.13x	13.9x	12.8x
Median	\$1,080.8	\$1,094.3	\$298.6	7.6%	2.8%	52.6%	3.7%	2.95x	2.78x	12.4x	11.7x

Source: Capital IQ, First Analysis.

Notes: *Public comparable company data shown above is as of March 3, 2025.

(1) EBITDA multiples less than 0 and greater than 35 labeled "not meaningful" (NMF). LTM = last 12 months. EBITDA = earnings before interest, taxes, depreciation and amortization.

(2) Figures shown are estimated for companies that as of March 3, 2025 had not reported results corresponding to the 2024 calendar year.

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One South Wacker Drive, Suite 3900 • Chicago, IL 60606 • 312-258-1400 • www.firstanalysis.com