GSMA
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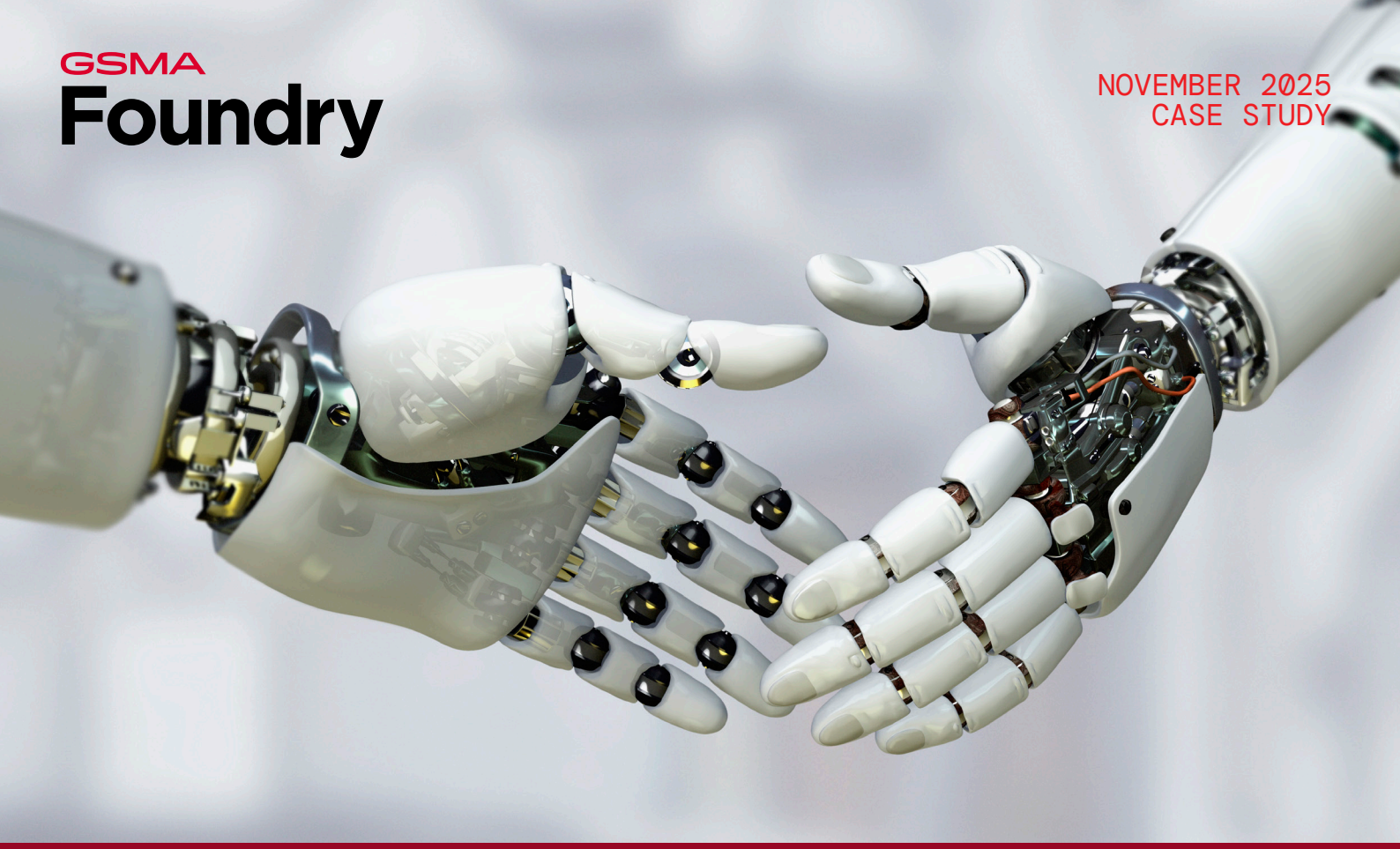
CASE STUDY



5G-Advanced Facilitates **Multi-Robot Collaboration**

Streamlined private 5G network architecture is designed to deliver robust high-performance connectivity to train and supervise robots

Executive Summary

- The development of physical AI promises to enable robots to work in a wide range of environments, such as hotels, factories, warehouses, ports and even homes.
- Private 5G networks could deliver the robust and flexible connectivity needed to train robots and later supervise them in enterprise environments.
- China Telecom, ZTE, DroidUp and AgiBot have teamed up to develop a simplified and robust private 5G network that uses 5G-Advanced technologies to support ultra-high throughput, ultra-low latency and high reliability connectivity.
- Their flexible EasyOn·Robot solution, which doesn't require a core network, is designed to ensure each robot has an uplink of 200 Mbps.
- In a demo, the connectivity enabled DroidUp robots to operate an unmanned convenience store, delivering an automated shopping experience with seamless entry, personalised recommendations, autonomous checkout, and delivery
- Aiming to establish "a significant industry presence" by 2027, ZTE says the EasyOn·Robot private network solution is targeted at a global market.

Challenge - mobile robots need continuous reliable connectivity

There is growing demand for mobile robots that can be employed across a wide range of environments from factories and farms to hotels and homes. To operate effectively in different locations, robots need to be trained to recognise and respond to the specifics of each physical environment. For example, in a home they might navigate a rug or a sofa, whereas in a port they may encounter slippery surfaces or strong winds.

To develop the necessary "physical artificial intelligence (AI)", robots need robust high-speed connectivity that can transmit the large volumes of data being captured by onboard cameras and other sensors to train the underlying AI models.

Even once the training is complete, a robot may still require continuous connectivity both to co-operate with other robots and to access information and processing power located on servers. While some robots may have sophisticated physical AI systems on-board, others may need to frequently query AI models running elsewhere. The balance between on-board computing power, cost and battery life will vary depending on the operational scenario and the specific needs of the industry in which the robot is operating.

> If the robot is slightly out of position, the connectivity can be used to make real-time adjustments, enabling high-precision positioning in dynamic environments.

For enterprise deployments, connectivity will also be required so that a central management system can monitor robots in real time, allocate tasks and even facilitate so-called swarm behaviours, in which multiple robots team up to complete complex tasks.

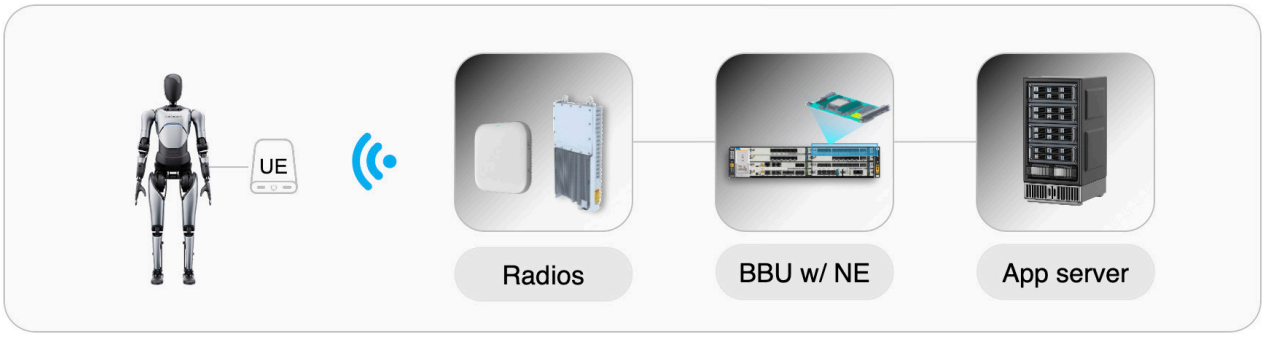
Connectivity can also help a robot determine its precise position. When first deployed in a new location, a robot will typically leverage its own capabilities to build a local map, which will need to be continually updated as the environment changes. After the robot uses the map to reach a designated location, it may be required to upload images, so that the server can confirm it is in exactly the right location to perform the required task. If the robot is slightly out of position, the connectivity can be used to make real-time adjustments, enabling high-precision positioning in dynamic environments.

Solution - a dedicated private 5G Advanced network

ZTE believes private 5G networks are well suited to meet robots' connectivity requirements. Whereas wired connections restrict mobility and Wi-Fi networks can be subject to interference and congestion, private 5G networks could deliver the robust and flexible connectivity needed to train robots and to supervise them in enterprise environments, such as factories, ports, warehouses and other industrial facilities.

China Telecom, ZTE, DroidUp (a humanoid robot company) and AgiBot (Zhiyuan Robotics) have teamed up to develop a simplified and robust private 5G network that enables robots to move freely across various scenarios. Their EasyOn·Robot solution uses 5G-Advanced technologies to support ultra-high throughput (up to 2 Gbps uplink and 6 Gbps downlink), ultra-low latency (under 10ms), and high reliability (99.99%) connectivity, according to ZTE, thereby enabling robots to move freely across different scenarios while maintaining real-time, high-quality data transmission.

5G-ADVANCED FACILITATES MULTI-ROBOT COLLABORATION



EasyOn·Robot is designed to support sufficient capacity to deliver uninterrupted connectivity in demanding high-density environments, such as an unmanned convenience store, where robots will need to autonomously guide, recommend, and deliver products efficiently. By ensuring that each robot has an uplink of 200 Mbps, ZTE says EasyOn·Robot can continuously capture high-resolution operational and environmental data in real-time.

To keep costs down and allow for easy deployment (in 1-2 days), the solution doesn't require a core-network. Instead, it utilises a plug-in single board edge compute capability (called NodeEngine) to execute essential 5G core functions, while maintaining high security and isolation from public networks, ZTE explains. By employing an "edge-device synergy" architecture, EasyOn·Robot is designed to enable diverse robot types to work together with standardised interfaces and seamless coordination.

"This architecture supports scalable, intelligent, and secure connectivity that adapts to complex, dynamic applications," ZTE says. "The platform's modular, multi-model support and edge-device synergy architecture is designed to enable heterogeneous robots—regardless of brand or model—to work seamlessly."

Results - multiple robots working together in entertainment and e-commerce

The four partners have demonstrated the new solution at major industry events. At the 2025 World Artificial Intelligence Conference, for example, EasyOn·Robot connectivity supported 10 AgiBot robots in live stage performances and on the "Shanghai Longtang" robotics street, showcasing multi-robot coordination for entertainment. The solution also enabled DroidUp robots to operate a 24/7 unmanned convenience store, delivering an automated shopping experience with seamless entry, personalised recommendations,

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autonomous checkout, and delivery. This store operated continuously, using the EasyOn·Robot private network to ensure millisecond-level sensor synchronisation and robotic coordination, ZTE says.

During 2025 Mobile World Congress Shanghai, EasyOn·Robot connectivity enabled AgiBot and DroidUp robots to collaborate in the same environment, demonstrating cooperative tasks such as customer interactions, guided shopping, and event reception, ZTE says. That demo required about two months of LLM (large language model) and VLM (visual language model) training.

By enabling real-time monitoring by edge nodes and dynamic task allocation through intelligent scheduling, ZTE says EasyOn·Robot has successfully demonstrated how robots can harness robust connectivity to exercise "team intelligence".

Next steps - targeting a growing global market

A report by Morgan Stanley estimated that the global robotics market registered a 17% compound annual growth (CAGR) between 2020 and 2024 to be worth US$122 billion in 2024. This growth was driven by accelerating industrial automation, labour shortages, and advances in AI and machine

learning technologies, according to the report. Morgan Stanley says China stands as the dominant force underpinning global demand, with its total addressable market reaching US$47 billion in 2024, or ~40% of the global market. The investment bank projects the market will grow 23% (CAGR) between 2025 and 2028 in China.

Anticipating that enterprises in other regions will also step up their investments in robotics, ZTE says the EasyOn·Robot private network is targeted at a global market. “With trends in automation and intelligence, market demand is expected to surge, especially among companies adopting advanced technologies to improve operational efficiency,” the tech company adds.

In the near-term, the project partners believe EasyOn·Robot can meet the requirement for comprehensive data collection and training within robot training grounds, capturing critical physical parameters, such as joint torque and trajectories - essential for refining robot control and intelligence. “The increasing demand for sophisticated robot training environments and data collection is driven by the need to develop accurate world models and enable advanced physical AI capabilities,” ZTE notes.

As more businesses embrace automation, there is likely to be growing demand for collaborative robot operations across the economy. One of the key selling points for EasyOn·Robot is its versatility. EasyOn·Robot is designed to enable a wide range of robot-types – humanoid, wheeled-leg, robotic arms and digital twin robots – to be quickly adapted to different tasks, environments, and user needs, paving the way for broad industry adoption. “The platform’s ability to quickly transfer among industries and scenarios makes it a highly transferable solution, ready to accelerate the adoption of 5G-enabled private networks worldwide,” ZTE says. “It supports comprehensive training environments for developing precise world models and realising physical AI, vital for next-generation automation.”

As a private 5G solution, the rollout of EasyOn·Robot in national markets could depend on the availability of suitable spectrum. In some countries, spectrum has been set aside for private 5G networks, while in other mobile network operators would need to provide the necessary capacity.

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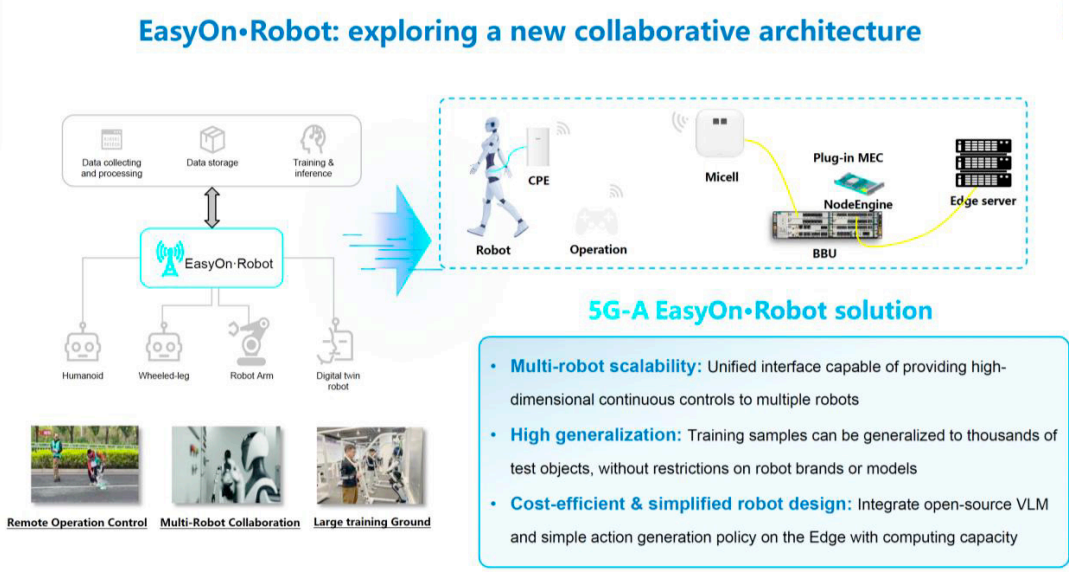
At a global level, ZTE’s goal is for the solution to establish “a significant industry presence” by 2027, through large-scale industrial upgrades, smart retail, healthcare, and logistics transformation, “heralding a new era of interconnected intelligent agents powered by edge-to-end 5G technology.”

At the same time, for the mobile industry, widespread adoption of EasyOn·Robot would accelerate the deployment of 5G-Advanced private networks globally, helping mobile operators make a return on their investments in this technology.



About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

For more information, please visit the GSMA corporate website at gsma.com

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About the GSMA Foundry

The GSMA Foundry is the go-to place for cross-industry collaboration and making positive change happen, supported by leading technology organisations and companies. By bringing together members and key industry players, engaging, and unifying the end-to-end connectivity ecosystem, the GSMA is solving real-world industry challenges.

Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. This enables the mobile industry's mission: to connect everyone and everything to a better future.

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About ZTE

ZTE Corporation is a leading global provider of telecommunications solutions and services, delivering innovative technologies that power networks, enterprises, and consumers worldwide. Established in 1985, ZTE operates in over 160 countries, specializing in comprehensive end-to-end solutions across fixed, mobile, IT, AI and enterprise networks. With expertise in 5G, Autonomous Networks (AN), cloud computing, AI, and IoT, ZTE empowers customers to achieve network intelligence, operational efficiency, and sustainability. Renowned for its commitment to research and development, ZTE drives cuttingedge advancements that enable seamless connectivity and digital transformation, building a smarter, more connected future for its global partners and communities.

For more information, visit: www.zte.com.cn

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