Solution Brief

Edge AI Industrial and Robotics
Intel® Core™ Ultra Series 3 Processors

Enabling Physical AI with Trossen Robotics on the Intel® Core™ Ultra Series 3 Processors

Accelerating the future of Physical AI by pushing boundaries and bringing advanced AI capabilities closer to production environments — enabling stable, scalable platforms that empower the entire robotics ecosystem.

Robotics is undergoing a major transformation driven by Physical AI, where machine learning enables robots to understand environments, adapt to change, and perform complex tasks with human-like dexterity. This shift is powered by visual language action (VLA) models, imitation learning, and end-to-end robotic control, requiring both high-performance compute and stable, scalable software foundations. Trossen Robotics, a long-established provider of modular, ROS-ready robotics platforms widely used across research, education, and applied robotics, stands at the center of this evolution.

Trossen Robotics, in collaboration with Intel, showcases a practical, end-to-end Physical AI workflow that covers data capture, model refinement, and seamless on-device deployment. Powered by the Intel® Core™ Ultra Series 3 processor and Intel's Edge AI toolchain, the joint solution enables faster robot-control inference, smoother motion, and a clear path from lab prototyping to repeatable edge deployments.

The Challenge

Trossen Robotics encountered a set of constraints as Physical AI transitioned from controlled lab environments to scalable, repeatable deployments. As the company expands into mobile embedded robotics, integrating an on-board computing platform capable of meeting these evolving demands became essential:

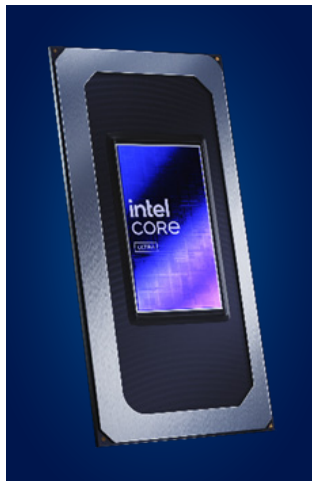

Figure 1. The Intel® Core™ Ultra Series 3 processor

- Run advanced VLA and imitation-learning models directly at the edge, enabling low-latency, on-device inference that supports real-time closed-loop control without dependence on cloud connectivity.
- Practical end-to-end workflow – reduce friction across full lifecycle
- Bring-up and integration – hardware, ROS, sensors, control stack reliability and repeatability
- Data capture – teleoperation and logging to create training and validation data sets
- Model iteration – fine-tune and evaluate robot-control and VLA models on representative data

- Edge deployment – run inference locally with low latency for closed-loop control
- Update loop – capture edge failures, fine-tune, and redeploy without breaking compatibility

The Solution

Trossen Robotics needed solutions in three areas:

- VLA inference with deterministic timing for real-time control
- AI deployment and optimization tooling to run models on the Intel architecture for runtime and acceleration
- Demonstrable and credible performance-per-watt advantage versus common robotics edge baselines

Powered by the Intel® Core™ Ultra Series 3 processors, Trossen Robotics built a unified Physical AI platform that streamlines the entire robotics lifecycle — from development to real-world operation.

Key capabilities include:

- Efficient path to deploy learned control at the edge (not only in labs)
- Stronger positioning around performance per watt for Physical AI robotics

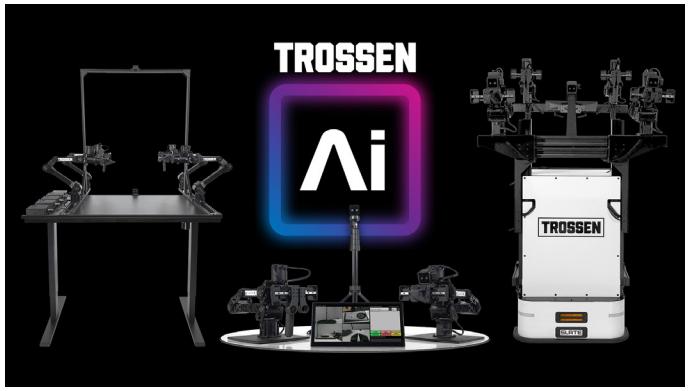

Figure 2. Trossen Robotics Physical AI platform

- End-to-end Deterministic Robotics Workflow – From data collection on Aloha arms to model fine-tuning to deployment on the Intel® Core™ Ultra Series 3 processors, all are supported under one ecosystem. Results showed huge improvements in real-time determinism and consistency, strengthening real-time servo loops and motion planning for robotic arms and mobile platforms.

Use Cases

Adaptive Sorting of Mixed Components

When there are unsorted parts in clutter and when user changes goals quickly, low-latency on-device inference supports responsive manipulation and rapid re-tasking.

High-Mix Kitting/ Pick-and-Place

High-mix kitting, or pick-and-place, is useful during frequent SKU changes or when there is an inconsistent part presentation. This reduces re-training and brittle scripting, as well as improves throughput and uptime.

Imitation Learning Pipeline for New Skills

Imitation learning is useful to capture demonstrations on Trossen platforms and fine-tune policies. Together, with Intel technology, this allows the compute to be deployed locally, creating a repeatable workflow for moving from prototype to pilot.

Intel Technology Advantage

Intel® Core™ Ultra Series 3 Processor: Delivers up to 180 TOPS for edge AI workloads

CPU: For low latency AI workloads

Integrated GPU: Accelerates AI inference locally

Intel NPU: Accelerates scalable, sustained AI workloads, supporting multi-model deployment at low power

Intel® Time Coordinated Computing (Intel® TCC): Supports deterministic timing and improves consistency for real-time robotics workloads

OpenVINO™ Toolkit: For optimized inference and runtime execution of AI workloads at the edge

Geti™ Application: Application workflow layer connecting language intent, perception, and action

Functional Safety: Enables safety and non-safety workload consolidation onto a single platform through Safety integrity feature

Proof Point

"In our evaluation, the Intel® Core™ Ultra Series 3 processor made a clear difference in how our robot-control models performed. Our lighter model ran 4.9x faster, our mid-range model ran 8.3x faster, and our more demanding model ran 8.6x faster than on Jetson AGX Orin. What our customers will notice is simple: faster decisions, smoother movement, and a robot that feels more capable in real environments. Panther Lake gives us a stronger foundation to keep improving the experience without increasing complexity or power demands."

- Luke Schmitt, Lead Software Engineer from Trossen Robotics during the Intel Core® Ultra™ Series 3 Processor Launch at CES 2026[1]

Partner Ecosystem

Intel and Trossen pair Physical AI robotics platforms with real-time edge compute and software.

Trossen Robotics: AI-ready arms and kits that support repeatable data capture and iteration through teleoperation workflows.

Intel: Edge compute with iGPU/NPU acceleration plus software and timing features for low-latency inference, deterministic control, and optimized performance.

Key Benefits

The combined ecosystem of Intel and Trossen Robotics enables seamless integration of high-performance Edge AI computing with ready-to-deploy robotic platforms, accelerating development and deployment. Among the key benefits are:

Performance-Per-Watt Advantage: Tested on robot-control models at the edge during Trossen Robotics testing.

End-to-End Physical AI Workflow: Features data capture, iteration and deployment instead of a standalone "robot and compute" story.

Practical Deployment Path: On-device inference for real-time control, reduces cloud dependency, and allows a replicable stack for pilots to sell.

Conclusion

Trossen Robotics and Intel are partnering to accelerate the future of physical AI. With the Intel® Core™ Ultra Series 3 processors, Trossen Robotics can push the boundaries of mobile manipulation, bring advanced AI closer to production environments, and deliver stable, scalable platforms for the entire robotics ecosystem.

Next Steps

Learn more about how Trossen Robotics and Intel are enabling Physical AI for a scalable and stable robotics ecosystem.

View Robotics AI Suite

Discover Trossen Robotics

intel.

[1] Source: "Intel CES 2026 Press Kit - Supporting Quotes," Intel Newsroom, 2026.

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