



NVIDIA Announces NVIDIA Isaac GR00T Reference Humanoid Robot for Academic Research

News Summary:

- NVIDIA announces an open humanoid robot reference design built on the NVIDIA Isaac GR00T platform, combining a Unitree H2 Plus humanoid robot, Sharpa five-fingered hands for dexterous manipulation, NVIDIA Jetson Thor onboard compute for advanced reasoning and control, and NVIDIA Isaac GR00T open software and models.
- The Isaac GR00T development platform -- spanning data capture and generation to robot model evaluation and deployment -- helps researchers and developers accelerate humanoid development workflows.
- Leading research institutions including Ai2, ETH Zurich, Stanford Robotics Center and UC San Diego's Advanced Robotics and Controls Laboratory will use the reference design to advance frontier humanoid robotics research.

NVIDIA GTC Taipei--NVIDIA today announced the NVIDIA Isaac™ GR00T Reference Humanoid Robot, the first open humanoid robot reference design built on [NVIDIA Jetson Thor™](#) and the [NVIDIA Isaac GR00T open development platform](#).

The reference design helps democratize frontier humanoid robotics research by providing access to advanced hardware and an open software stack without requiring proprietary platforms.

As demand for [general-purpose humanoids](#) accelerates, researchers still face a fragmented process spanning hardware integration, data collection, simulation, training, evaluation and deployment.

The NVIDIA Isaac GR00T Reference Humanoid Robot unifies development by bringing a Unitree H2 Plus humanoid robot and Sharpa Wave tactile five-finger hands (the "body"), with NVIDIA Jetson Thor-powered onboard compute and Isaac GR00T software and workflows (the "brain") into a single integrated reference design, helping research teams move faster from robot bring-up to skill development and real-world validation.

With NVIDIA's compute and open software stack at the center, the reference design gives research teams a more unified, secure foundation for advancing humanoid robotics.

"Humanoid robots will bring physical AI to the world's largest industries, opening a multitrillion-dollar economic opportunity," said Jensen Huang, founder and CEO of NVIDIA. "The NVIDIA Isaac GR00T Reference Humanoid Robot gives researchers a single, open platform to make breakthrough discoveries toward general-purpose physical intelligence."

A State-of-the-Art Humanoid Robot for Physical AI Development

The NVIDIA Isaac GR00T Reference Humanoid Robot is a state-of-the-art platform that brings the key building blocks for frontier humanoid research into one system, pairing a human-scale robot body with dexterous manipulation, sensing, control and onboard AI compute.

The reference design features:

- **Unitree H2 humanoid chassis**, standing nearly 6 feet tall and weighing 150 pounds, with 31 degrees of freedom across the body for human-scale testing.
- **Dual [Sharpa Wave](#) tactile five-finger hands**, enabling dexterous manipulation with 22 degrees of freedom and bringing the robot to 75 degrees of freedom across the body and hands.
- **Multi-view sensing**, including a head-mounted stereo camera with wide field of view (140 degrees horizontal, 102 degrees vertical), wrist cameras for close-range manipulation and an inertia measurement unit for motion tracking.
- **Whole-body control**, with arm torque of up to 120 Newton-meters, leg torque of up to 360 Newton-meters, a rated arm payload of 7 kilograms and peak payload of 15 kilograms, unlocking more capable lifting and reach.
- **NVIDIA Jetson AGX Thor™ T5000 onboard compute**, featuring an NVIDIA Blackwell GPU with 2,070 FP4 teraflops of AI performance, a 14-core Arm CPU, 128GB of unified memory and a configurable 40- to 130-watt power range for real-time sensor processing and robot inference.
- **Connectivity** across Ethernet, Wi-Fi 6, Bluetooth 5.2, USB and an array of microphones and speakers for voice interaction.
- **Battery for extended operation**, with a 15Ah, 0.972kWh capacity and about three hours of life.
- **On-remote emergency stop** function for quickly disengaging the robot safely.

NVIDIA Isaac GR00T Provides a Full-Stack Platform for Humanoid Development

The NVIDIA software stack provides the development environment for simulation, training, evaluation and deployment, while researchers retain control of their robot data, training data, telemetry and logs.

The Isaac GR00T platform includes:

- [NVIDIA Isaac Teleop](#) to capture high-quality robot demonstration data for training and policy development.
- [NVIDIA Isaac GR00T open foundation models](#) to support humanoid reasoning, learning and multitask behavior.
- [NVIDIA Isaac Sim™](#) and [Isaac Lab](#) to simulate, train, test and evaluate robot policies before real-world deployment.
- [Accelerated NVIDIA Isaac ROS middleware](#) to move trained policies onto robots.
- [NVIDIA Jetson Thor](#) to run real-time, on-robot inference and control.

Its modular design lets robotics teams use the full platform or integrate selected capabilities into existing development pipelines, helping them scale humanoid development without rebuilding the same infrastructure for each robot or task.

The NVIDIA Isaac GR00T developer platform will also support the Unitree G1 humanoid robot, extending the same development approach to a robot widely used by researchers and humanoid developers across leading institutions.

Accelerating the Robotics Research Ecosystem

Leading research institutions including Ai2, ETH Zurich, Stanford Robotics Center and UC San Diego's Advanced Robotics and Controls Laboratory will use this humanoid robot reference design to advance frontier humanoid robotics research.

"Robotics moves fastest when researchers can build on open platforms, share code and test ideas on real machines," said Steve Cousins, executive director of the Stanford Robotics Center. "The NVIDIA Isaac GR00T Reference Robot gives our students and collaborators an open humanoid reference design with dexterous hands, onboard AI compute and the NVIDIA Isaac GR00T development platform for creating, comparing and sharing robot behaviors on physical hardware."

"ETH Zurich's robotics research aims to advance machines that can move, perceive and manipulate reliably in the real world," said Marco Hutter, professor at ETH Zurich's Robotic Systems Lab. "The NVIDIA Isaac GR00T reference design gives our teams a state-of-the-art humanoid platform for collecting data, testing algorithms and validating robot behaviors with the NVIDIA Isaac GR00T development platform."

"To make progress toward general-purpose robots, researchers need platforms that are both capable and broadly accessible," said Deepak Pathak, cofounder and CEO of Skild AI. "A reference design lets more researchers participate in frontier humanoid research and move from ideas to experiments faster. This helps push the whole robotics research ecosystem forward."

"At Ai2, our mission is to accelerate robotics through open science," said Dieter Fox, senior research director at Ai2 and professor at the University of Washington. "The NVIDIA Isaac GR00T Reference Robot, built on NVIDIA's open technologies, provides our researchers with the hardware and software components necessary to continue our work in broadly competent robotics."

"Advancing robotics research for real-world problems requires humanoids that can move, interact and manipulate with precision in dynamic environments," said Michael Yip, professor at UC San Diego and director of the Advanced Robotics and Controls Laboratory. "An integrated platform that connects robot hardware, data capture, policy learning and physical evaluation can help researchers accelerate loco-manipulation research and develop more useful real-world systems."

[NVIDIA Research](#) will also use this reference design to advance Isaac GR00T open models, frameworks and hardware.

Availability

The NVIDIA Isaac GR00T Reference Humanoid Robot will be available [from Unitree](#) in late 2026.

The NVIDIA Isaac GR00T reference workflow for Unitree G1 is expected to be available soon on GitHub and Hugging Face for robot developers.

Watch Huang's [keynote](#) and learn more at [NVIDIA GTC Taipei](#).

About NVIDIA

[NVIDIA](#) (NASDAQ: NVDA) is the world leader in AI and accelerated computing.

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