TROY TECHNICAL

DRONES & ROBOTICS

WEEKLY REPORT

November 14 - November 20, 2026 | Issue 2026-W46

Safe autonomy, task economics, fleet operations and regulatory access

13	10
ANALYZED ARTICLES	PRIORITY THEMES

Issued 2026-11-20 | English edition | fixed approved cover artwork



Drones & Robotics: the boundary moved from isolated claims to qualification evidence

13 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | SENSING & AI

XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration

ROBOTERA has launched the XHAND 1 Pro-U, a 16-degree-of-freedom dexterous robot hand designed to map directly to NVIDIA's DexUMI exoskeleton.

SIGNAL 02 | ROBOT PLATFORM

Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap

Sartexo has developed a garment-type wearable robot using "muscle fabric" that can lift objects up to 1,500 times the fabric's own weight.

SIGNAL 03 | TASK EXECUTION

Mitsubishi Electric LiDAR: 600m detection for rail automation

Mitsubishi Electric has developed a high-performance LiDAR sensor capable of detecting objects 600 meters away, with commercialization planned for fiscal 2027.

SIGNAL 04 | FLEET OPERATIONS

MIIT Humanoid Robot Standards: 5 New Frameworks for 2026

China's Ministry of Industry and Information Technology (MIIT) has released five standards for humanoid robots covering intelligence levels, hardware specifications, and training data.

DECISION

Focus this week's management attention on safe autonomy, task economics, fleet operations and regulatory access. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics.
2. Suppliers: provide sensors, actuators, compute and service evidence under real operating conditions.
3. Executives: track intervention, safety, uptime, liability, regulation, fleet scale and cost.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Numbers and evidence anchors that require conditions

60%
A08

SOURCE-BOUND CONDITION
In evaluations using GR00T 2, the system achieved success rates between 60% and 80% across three complex bimanual tasks, whereas previous models failed all tasks.

500 times
A02

SOURCE-BOUND CONDITION
Sartexo has developed a garment-type wearable robot using "muscle fabric" that can lift objects up to 1,500 times the fabric's own weight.

000 hours
A07

SOURCE-BOUND CONDITION
Robbyant has open-sourced LingBot-Touch, a tactile foundation model pre-trained on nearly 5,000 hours of real-world data to provide robots with unified touch perception.

HOW TO USE THESE NUMBERS
Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.

1

Sensing & AI

P01/P06

ROBOTERA has launched the XHAND 1 Pro-U, a 16-degree-of-freedom dexterous robot hand designed to map directly to NVIDIA's.

2

Robot platform

P02/P07

Sartexo has developed a garment-type wearable robot using "muscle fabric" that can lift objects up to 1,500 times the.

3

Task execution

P03/P08

Mitsubishi Electric has developed a high-performance LiDAR sensor capable of detecting objects 600 meters away, with.

4

Fleet operations

P04/P09

China's Ministry of Industry and Information Technology (MIIT) has released five standards for humanoid robots covering.

5

Regulation & service

P05/P10

Huawei Cloud has open-sourced CloudRobo-WM1.2, an embodied world model native to Ascend computing that ranks first in.

EVIDENCE REQUIRED AT EACH HANDOFF

Sensing & AI to Robot platform	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck intervention, safety, uptime, liability, regulation, fleet scale and cost.
Robot platform to Task execution	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck intervention, safety, uptime, liability, regulation, fleet scale and cost.
Task execution to Fleet operations	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck intervention, safety, uptime, liability, regulation, fleet scale and cost.
Fleet operations to Regulation & service	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck intervention, safety, uptime, liability, regulation, fleet scale and cost.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented intervention, safety, uptime, liability, regulation, fleet scale and cost.

Priority map: maturity and next decision locus



P01	XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration System / adoption | cue: Integration
P02	Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap System / adoption | cue: Commercial
P03	Mitsubishi Electric LiDAR: 600m detection for rail automation System / adoption | cue: commercialization
P04	MIIT Humanoid Robot Standards: 5 New Frameworks for 2026 Business / rules | cue: Standards
P05	Huawei Cloud CloudRobo-WM1.2: Embodied World Model Specs Business / rules | cue: infrastructure
P06	Soft Robotics: UC San Diego's 3D-Printed Robot Speed Specs System / adoption | cue: system
P07	UPenn Artificial Muscle Fiber: Precision Control for Robotics System / adoption | cue: integrated
P08	MIT Microrobot: Onboard Sensing for Motion-Capture-Free Flight System / adoption | cue: system
P09	Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Specs System / adoption | cue: integrates
P10	LingBot-Touch: Robbyant's Open-Source Tactile Foundation Model Tech / process | cue: no system/business cue

REPRODUCIBLE POSITIONING RULE

Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01 XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration

A08 | Sensing & AI | Joint evaluation

2026-11-16

FACT

ROBOTERA has launched the XHAND 1 Pro-U, a 16-degree-of-freedom dexterous robot hand designed to map directly to NVIDIA's DexUMI exoskeleton. In evaluations using GR00T 2, the system achieved success rates between 60% and 80% across three complex bimanual tasks, whereas previous models failed all tasks. This integration enables research teams to collect force-aware human demonstrations without occupying the robot.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 21/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

P02 Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap

A02 | Robot platform | Joint evaluation

2026-11-18

FACT

Sartexo has developed a garment-type wearable robot using " muscle fabric" that can lift objects up to 1,500 times the fabric's own weight. The system reduces lower-back muscle activity by over 40% during heavy lifting, offering a motorless alternative for industrial and caregiving support.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 20/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03 Mitsubishi Electric LiDAR: 600m detection for rail automation

A13 | Task execution | Pilot

2026-11-18

FACT

Mitsubishi Electric has developed a high-performance LiDAR sensor capable of detecting objects 600 meters away, with commercialization planned for fiscal 2027. The system identifies obstacles as small as 20 centimeters to support the transition toward autonomous train operations.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 20/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

P04 MIIT Humanoid Robot Standards: 5 New Frameworks for 2026

A10 | Fleet operations | Research

2026-11-17

FACT

China's Ministry of Industry and Information Technology (MIIT) has released five standards for humanoid robots covering intelligence levels, hardware specifications, and training data. These standards establish a grading system from L0 to L5 and unify technical requirements for integrated joints and dexterous hands to improve integration efficiency.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05 Huawei Cloud CloudRobo-WM1.2: Embodied World Model Specs

A11 | Regulation & service | Pilot

2026-11-16

FACT

Huawei Cloud has open-sourced CloudRobo-WM1.2, an embodied world model native to Ascend computing that ranks first in RoboTwin 2.0 and Libero Pro 2.0 benchmarks. The release introduces a three-tier open ecosystem and a full-stack native Ascend infrastructure to reduce dependency on CUDA and TPU ecosystems.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: BUSINESS / RULES

P06 Soft Robotics: UC San Diego's 3D-Printed Robot Speed Specs

A04 | Sensing & AI | Pilot

2026-11-18

FACT

Researchers at UC San Diego have developed the fastest soft robot to date, reaching speeds of 4.72 meters per second. By utilizing a compound steam engine-inspired pneumatic system, the electronics-free robot achieves a 100-fold speed increase over previous iterations. This advancement enables high-speed locomotion in environments where electronics are non-functional, such as high-radiation zones.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07 UPenn Artificial Muscle Fiber: Precision Control for Robotics

A01 | Robot platform | Pilot

2026-11-19

FACT

Engineers at the University of Pennsylvania have developed a composite artificial muscle fiber that uses an integrated copper coil to eliminate position drift. By combining a liquid crystal elastomer with graphene and a dual-purpose heater-sensor, the fiber enables fine-motor tasks such as varying piano key pressure and maintaining a steady gaze.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

P08 MIT Microrobot: Onboard Sensing for Motion-Capture-Free Flight

A12 | Task execution | Pilot

2026-11-18

FACT

MIT researchers have developed a 1.29-gram flapping-wing robot capable of hovering and landing using onboard sensing and computation. By increasing actuator size to support a 244-milligram electronics package, the system achieves centimeter-scale positional accuracy without external motion-capture systems.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Specs

A05 | Fleet operations | Pilot

2026-11-18

FACT

Researchers at KAIST have developed a curved lithium-sulfur battery cathode that integrates energy storage directly into drone and robotic frames. By growing nickel cobalt selenide nanowires on woven carbon cloth, the team achieved a monolithic electrode capable of maintaining 99.8 percent of its voltage even under mechanical loads sufficient to fracture the surrounding frame.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

P10 LingBot-Touch: Robbyant's Open-Source Tactile Foundation Model

A07 | Regulation & service | Research

2026-11-15

FACT

Robbyant has open-sourced LingBot-Touch, a tactile foundation model pre-trained on nearly 5,000 hours of real-world data to provide robots with unified touch perception. The model improves task success rates by 14 to 26 percentage points across various action models, enabling high-precision manipulation regardless of the specific sensor hardware used.

WHY IT MATTERS

The decision relevance is safe autonomy, task economics, fleet operations and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide sensors, actuators, compute and service evidence under real operating conditions.

ACTION

Within 30 days, compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics; record the evidence and owner against P10.

UNKNOWN

Still unproven or incompletely stated: intervention, safety, uptime, liability, regulation, fleet scale and cost.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW | 0-30 DAYS	NEXT | 1-12 MONTHS	LATER | 1-5 YEARS
Operating companies	compare humanoids, drones and robotaxis by task success, intervention rate, safety and unit economics	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	provide sensors, actuators, compute and service evidence under real operating conditions	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map intervention, safety, uptime, liability, regulation, fleet scale and cost.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW | 0-30 DAYS
Evidence ledger
Owner: Strategy + quality
Deliverable: claim, source, condition, owner

NOW | 0-30 DAYS
Risk screen
Owner: Procurement + legal
Deliverable: unknowns, alternatives, stop

NEXT | 1-12 MONTHS
Joint qualification
Owner: R&D + supplier
Deliverable: process window and failure data

NEXT | 1-12 MONTHS
Commercial gate
Owner: Business + finance
Deliverable: unit economics and capacity

LATER | 1-5 YEARS
Platform strategy
Owner: Executive team
Deliverable: portfolio and interface roadmap

LATER | 1-5 YEARS
Service layer
Owner: Operations + channel
Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	**Quality**	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	**R&D**	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	**Business**	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	**Operations**	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-13

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	UPenn Artificial Muscle Fiber: Precision Control for Robotics	https://www.techspot.com/news/114610-robots-can-do-backflips-but-cant-hold-gaze.html
A02	Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap	https://en.sedaily.com/business/2026/11/18/wearable-robot-with-muscle-fabric-lifts-1500-times-its
A03	DGIST Soft Robot Sensor: Battery-Free Mechanoluminescent Fiber	https://www.asiaresearchnews.com/content/%E2%80%9Cflashing-green-every-movement%E2%80%9D-dgist-develops-battery-free-self-illuminating-soft-robot
A04	Soft Robotics: UC San Diego's 3D-Printed Robot Speed Specs	https://today.ucsd.edu/story/the-fastest-soft-robot-ever-built-doesnt-need-electronics-to-function
A05	Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Specs	https://bioengineer.org/engineers-develop-curved-lithium-sulfur-battery-electrodes-for-drone-frame-energy-storage/
A06	T-Rex AI: Panasonic HD's Tactile-Reactive Robot Manipulation	https://aismiley.co.jp/ai_news/panasonic-robot-manipulation-ai/
A07	LingBot-Touch: Robbyant's Open-Source Tactile Foundation Model	https://roboticsandautomationnews.com/2026/11/15/robbyant-launches-lingbot-touch-to-give-robots-a-sense-of-touch/107152/
A08	XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration	https://www.unite.ai/robotera-opens-orders-for-xhand-1-pro-u-dexterous-robot-hand/
A09	NTT Physical AI: Physics-Based World Model for Robot Failure Prediction	https://aismiley.co.jp/ai_news/ntt-physical-ai-world-model/
A10	MIIT Humanoid Robot Standards: 5 New Frameworks for 2026	https://www.thepaper.cn/newsDetail_forward_34492647
A11	Huawei Cloud CloudRobo-WM1.2: Embodied World Model Specs	https://news.qq.com/rain/a/20261116A0CCMV00
A12	MIT Microrobot: Onboard Sensing for Motion-Capture-Free Flight	https://www.unite.ai/mit-microrobot-flies-without-motion-capture-using-onboard-sensors/
A13	Mitsubishi Electric LiDAR: 600m detection for rail automation	https://www.nikkei.com/article/DGXZQOCC186M90Y6A111C2000000/

Drones_Robotics — Selected Articles

Date: 2026-11-21

Articles: 13

Table of Contents

#01 UPenn Artificial Muscle Fiber: Precision Control for Robotics

#02 Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap

#03 DGIST Soft Robot Sensor: Battery-Free Mechanoluminescent Fiber

#04 Soft Robotics: UC San Diego's 3D-Printed Robot Speed Specs

#05 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Specs

#06 T-Rex AI: Panasonic HD's Tactile-Reactive Robot Manipulation

#07 LingBot-Touch: Robbyant's Open-Source Tactile Foundation Model

#08 XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration

#09 NTT Physical AI: Physics-Based World Model for Robot Failure Prediction

#10 MIIT Humanoid Robot Standards: 5 New Frameworks for 2026

#11 Huawei Cloud CloudRobo-WM1.2: Embodied World Model Specs

#12 MIT Microrobot: Onboard Sensing for Motion-Capture-Free Flight

#13 Mitsubishi Electric LiDAR: 600m detection for rail automation

#01 UPenn Artificial Muscle Fiber: Precision Control for Robotics

Published November 19, 2026 TechSpot USA



OVERVIEW

Engineers at the University of Pennsylvania have developed a composite artificial muscle fiber that uses an integrated copper coil to eliminate position drift. By combining a liquid crystal elastomer with graphene and a dual-purpose heater-sensor, the fiber enables fine-motor tasks such as varying piano key pressure and maintaining a steady gaze.

IN DEPTH

Key Findings

Researchers at the University of Pennsylvania have created an artificial muscle fiber capable of maintaining precise positions without drifting back to a resting shape. In laboratory tests, this technology allowed a robotic hand to strike piano keys with varying force and enabled robotic eyes to hold a steady gaze, overcoming a common limitation in soft robotics where materials typically creep back to their original length as they cool.

Technical Details

The fiber is a composite material where each component serves a specific function:

- **Liquid Crystal Elastomer (LCE):** Acts as the primary actuator, contracting and stretching when heated.
- **Graphene:** Mixed into the elastomer to increase softness and toughness, allowing the fiber to withstand tension when working in opposing muscle pairs.
- **Copper Coil:** An ultrathin coil that functions simultaneously as a heater and a temperature sensor.

To solve the problem of positional drift, the system uses the electrical resistance of the embedded copper coil as a feedback signal. By monitoring this resistance in real time, the system adjusts heating power to keep the fiber at a target value, removing the need for separate external sensors.

Background & Context

Traditional humanoid robots rely on rigid motors and mechanical parts, which are effective for lifting and walking but struggle with subtle movements like folding laundry. While soft materials offer a more human-like alternative, they often lack the necessary combination of strength and flexibility. This project is part of a broader trend toward muscle-like actuators, alongside other developments such as synthetic hydrogel skin and the "musculoskeletal android" released by Polish startup Clone Robotics in 2025.

Significance & Outlook

The integration of the sensor and heater into a single component allows for a simpler design that can be scaled down and packed densely. The team intends to combine these fibers into larger systems to create natural-looking facial expressions and plans to explore the use of AI computer vision to coordinate these muscle groups for more human-like movement.

Source: https://www.techspot.com/news/114610-robots-can-do-backflips-but-cant-hold-gaze.html

Collected: November 21, 2026 | Automated Research System (AI)

#02 Bionic Suit: Sartexo's Muscle Fabric Specs and Commercial Roadmap

Published November 18, 2026 Seoul Economic Daily South Korea



OVERVIEW

Sartexo has developed a garment-type wearable robot using "muscle fabric" that can lift objects up to 1,500 times the fabric's own weight. The system reduces lower-back muscle activity by over 40% during heavy lifting, offering a motorless alternative for industrial and caregiving support.

IN DEPTH

Key Findings

The Bionic Suit, developed by Sartexo and the Korea Institute of Machinery and Materials, utilizes a specialized muscle fabric to assist movements in the lower back, shoulders, and elbows. Tests using electromyography sensors demonstrated that wearing the suit reduces lower-back muscle activity by more than 40% during repeated dumbbell lifts. While muscle fatigue typically increases with repeated lifts, the suit maintains consistently low muscle activity, significantly reducing fatigue during heavy-load tasks.

Technical Details

The core technology consists of shape-memory alloy wires processed into coils 40 micrometers thick—less than half the thickness of a human hair. These coils are woven into a fabric that contracts when heated by an electric current and relaxes via air cooling. This coil structure overcomes the 4% to 5% contraction limit of ordinary shape-memory alloy wires, allowing the fabric to more closely mimic human muscle contraction (which can reach 40%).

- **Force Output:** 10 grams of muscle fabric can generate enough force to lift objects weighing 10 to 15 kilograms.
- **Safety Measures:** To protect the wearer, the suit includes an insulating layer and flame-retardant materials to keep skin temperature at or below 40 degrees Celsius. Temperature sensors provide automatic power cutoff during overheating, and a cooling fan is included for outdoor use.

Background and Context

Principal researcher Park Chul-hoon began researching shape-memory alloys in 2012 for humanoid robots before pivoting to wearable technology to improve conditions for delivery drivers and laborers. The resulting "Bionic Suit Full" is the world's first garment-type wearable robot capable of assisting three joints simultaneously without the use of motors or rigid frames.

Significance and Outlook

Sartexo has transitioned from manual coil joining to automated weaving technology to increase productivity for commercialization. The company is targeting B2B sales in logistics, construction, manufacturing, and defense, with projected pricing for lower-back assist models ranging from under 1 million won to the mid-1 million-won range. Future expansion into B2C markets for older adults and people with disabilities is planned pending medical device certification.

Source: https://en.sedaily.com/business/2026/11/18/wearable-robot-with-muscle-fabric-lifts-1500-times-its

Collected: November 21, 2026 | Automated Research System (AI)

#03 DGIST Soft Robot Sensor: Battery-Free Mechanoluminescent Fiber

Published November 16, 2026 Asia Research News（DGIST） South Korea



OVERVIEW

Researchers at DGIST have developed a battery-free, self-illuminating sensing technology for soft robots using mechanoluminescent fibers. The system provides intuitive visual tracking of movement trajectories by emitting green light upon deformation, eliminating the need for rigid electronic sensors.

IN DEPTH

Key Findings

A research team led by Professor Soon Moon Jeong at DGIST has developed a tubular mechanoluminescent fiber that enables soft robots to emit green light during movement. This technology functions as a battery-free optical sensor, allowing for the direct and intuitive observation of bending and stretching trajectories without external power supplies or complex electronic circuitry.

Technical Details

The sensing technology utilizes "mechanoluminescence," a phenomenon where materials emit light when subjected to mechanical forces such as pressure, bending, or stretching. The team engineered the fibers by mixing zinc sulfide luminescent particles with a flexible polymer material, which was then filled into an elastic silicone tube. Technical specifications include:

- **Durability:** The fibers can withstand stretching to more than 200% of their original length.
- **Stability:** Initial light-emitting performance is maintained after more than 1,000 stretching–release cycles.
- **Implementation:** The fibers are applied as a mesh-like network over the surface of the soft robot, triggering immediate light emission from areas undergoing deformation.

Background & Context

Soft robots, constructed from rubber or silicone, are designed for medical devices and disaster rescue due to their ability to mimic human muscles or octopus arms. However, traditional movement detection requires the attachment of numerous rigid electronic sensors and wires, which often compromises the robot's inherent flexibility. This research, co-authored by Minseok Lee and Seongkyu Song, was published as the Front Cover article in the October issue of *Small Structures*.

Significance & Outlook

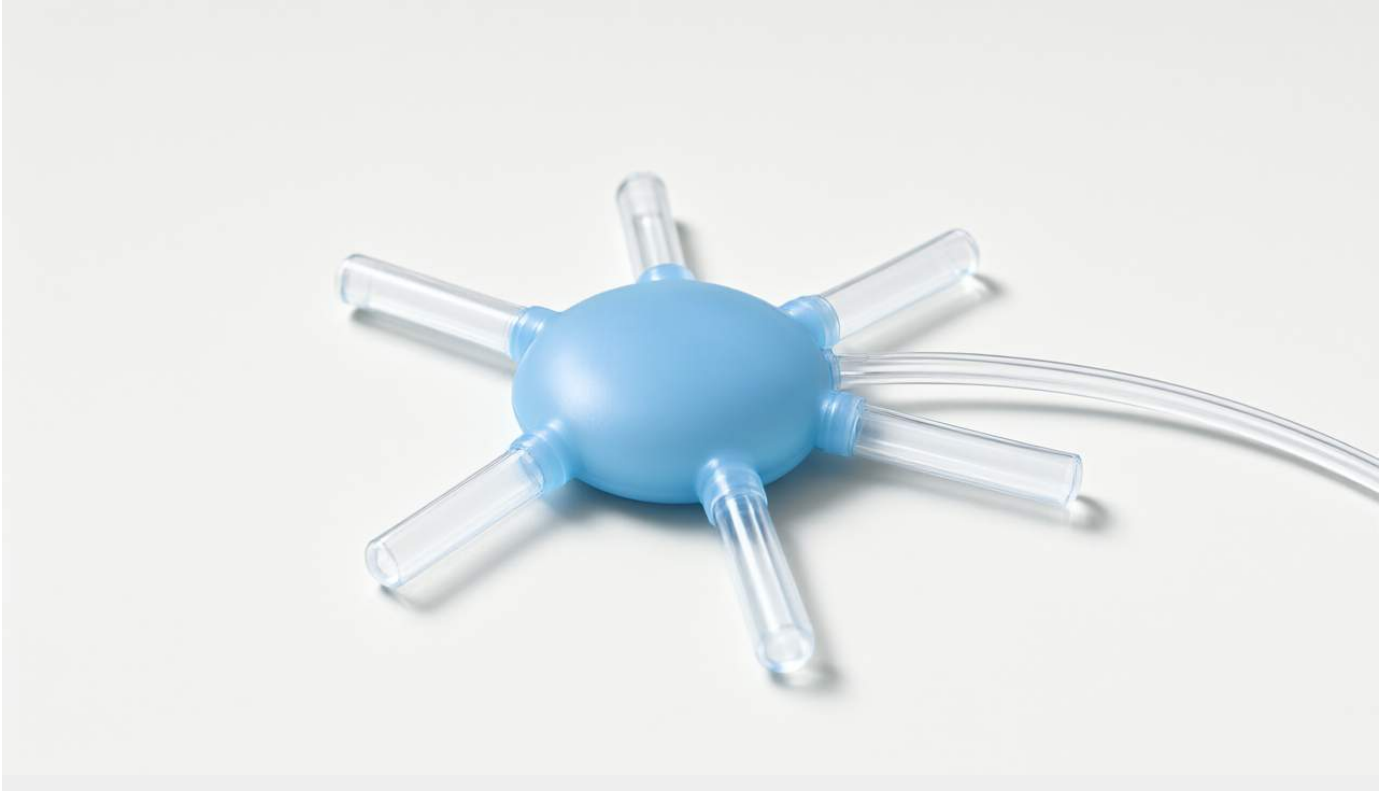
This approach provides a method for detecting deformation in soft robots without interfering with their flexible movements or requiring external power. Professor Soon Moon Jeong stated that the team intends to further improve fiber durability and light-emitting performance. Future applications are expected to expand into next-generation flexible electronic devices, including artificial skin and wearable devices for human–robot interaction.

Source: https://www.asiaresearchnews.com/content/%E2%80%9Cflashing-green-every-movement%E2%80%9D-dgist-develops-battery-free-self-illuminating-soft-robot

Collected: November 21, 2026 | Automated Research System (AI)

#04 Soft Robotics: UC San Diego's 3D-Printed Robot Speed Specs

Published November 18, 2026 UC San Diego Today USA



OVERVIEW

Researchers at UC San Diego have developed the fastest soft robot to date, reaching speeds of 4.72 meters per second. By utilizing a compound steam engine-inspired pneumatic system, the electronics-free robot achieves a 100-fold speed increase over previous iterations. This advancement enables high-speed locomotion in environments where electronics are non-functional, such as high-radiation zones.

IN DEPTH

Key Findings

Engineers at the UC San Diego Jacobs School of Engineering have produced a six-legged soft robot capable of reaching speeds of 4.72 meters per second. The robot is 3D-printed in a single piece using one material and operates entirely without electronics. Testing confirms the robot can navigate diverse terrains, including concrete, sand, mulch, and gravel, and is capable of swimming and walking underwater.

Technical Details

The robot's movement is driven by a network of internal chambers, valves, and tubes powered by pressurized air. To overcome the speed limitations of previous designs, the team implemented a design based on the compound steam engine. This architecture allows pressurized air to circulate twice: first through smaller, high-pressure chambers to power the valves, and subsequently through larger, low-pressure chambers to move the legs. This method maximizes energy efficiency from high-pressure air, allowing the robot to move more than 100 times faster than the team's 2022 prototype, which moved at 4 centimeters per second.

Background & Context

The project was led by Professor Michael T. Tolley and postdoctoral researcher Yichen Zhai in the Bioinspired Robotics and Design Laboratory. The research builds upon a 2022 air-powered soft robot detailed in a 2025 article in Advanced Intelligent Systems. The current findings are published in the November 18, 2026, issue of Science Robotics. The work received funding from the National Science Foundation.

Significance & Outlook

Currently, the robot requires a tether to a compressed air source. Future development aims to integrate portable air cartridges to enable untethered operation and implement designs for steering and object manipulation. Because it functions without electronics, this class of robot is suited for specialized applications, including space exploration, disaster response, and scientific reconnaissance in areas with high magnetic fields or radiation.

Source: https://today.ucsd.edu/story/the-fastest-soft-robot-ever-built-doesnt-need-electronics-to-function

Collected: November 21, 2026 | Automated Research System (AI)

#05 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Specs

Published November 18, 2026 BIOENGINEER.ORG South Korea



OVERVIEW

Researchers at KAIST have developed a curved lithium-sulfur battery cathode that integrates energy storage directly into drone and robotic frames. By growing nickel cobalt selenide nanowires on woven carbon cloth, the team achieved a monolithic electrode capable of maintaining 99.8 percent of its voltage even under mechanical loads sufficient to fracture the surrounding frame.

IN DEPTH

Key Findings

The research team led by Professor Il-Kwon Oh at the Korea Advanced Institute of Science and Technology (KAIST) has created a structural lithium-sulfur battery cathode that maintains stable electrical performance within curved and hollow geometries. The electrode demonstrated extreme mechanical durability, surviving 1,000 bending cycles at a curvature radius of 2.5 millimeters without structural collapse, cracking, or material detachment. In load testing within a cylindrical housing, the battery retained 99.8 percent of its initial operational voltage during external mechanical forces that fractured the structural frame.

Technical Details

To eliminate the delamination common in surface slurry coatings, the team grew nickel cobalt selenide nanowires directly onto woven carbon cloth. This monolithic integration provides several technical advantages:

- **Chemical Anchoring:** The nickel cobalt selenide compound catalyzes sulfur-related redox reactions and anchors lithium polysulfides to prevent their dissolution and migration into the electrolyte.
- **Electrical Continuity:** Direct growth of nanowires on the carbon fiber substrate ensures continuous electrical conduction pathways.
- **Geometric Versatility:** The material was successfully integrated into oval, square, and drone-leg structural components, powering LEDs across all varied contours.

Background & Context

Conventional drone and robotic architectures separate the structural airframe from rigid battery packs, which limits weight reduction. While lithium-sulfur systems offer high theoretical energy capacity at low weight, they typically suffer from poor electrical conductivity of elemental sulfur and the migration of lithium polysulfides. Furthermore, traditional flat battery configurations cannot be integrated into the curved or tubular surfaces common in landing gear and robotic limbs.

Significance & Outlook

This architecture allows load-bearing parts to function as energy storage medium, potentially reducing overall platform weight. The researchers suggest that this electrode could be paired with carbon fiber and resin matrices to build multifunctional robotic airframes. Future research is required to quantify the exact reduction in structural weight and the resulting extension of flight or mission durations.

Source: https://bioengineer.org/engineers-develop-curved-lithium-sulfur-battery-electrodes-for-drone-frame-energy-storage/

Collected: November 21, 2026 | Automated Research System (AI)

#06 T-Rex AI: Panasonic HD's Tactile-Reactive Robot Manipulation

Published November 17, 2026 AIsmiley Japan



OVERVIEW

Panasonic HD, in collaboration with UC Berkeley and NVIDIA, developed "T-Rex," an AI for robot manipulation that integrates visual-language action generation with high-speed tactile feedback. The system achieved a 65% average success rate across 12 contact-heavy tasks, significantly outperforming vision-only models.

IN DEPTH

Key Findings

The T-Rex (Tactile-Reactive Dexterous Manipulation) AI achieved an average success rate of 65% in 12 real-world tasks involving physical contact, such as turning keys and flipping pages. This performance represents a 30-percentage-point increase over comparison methods, which scored 35%. When tactile information was removed, the success rate dropped to 42%, validating the necessity of high-speed tactile response for dexterous manipulation.

Technical Details

T-Rex addresses the limitations of traditional Vision-Language-Action (VLA) models, which rely heavily on camera imagery and suffer from low update frequencies that cannot match the speed required for tactile reactions. The architecture integrates two distinct layers: a low-frequency "visual-language-based action generation" layer for general movement and a high-frequency "tactile-based action correction" layer for immediate adjustments to slips or deformations.

The model was trained using a multi-stage process:

- **General Knowledge:** Learning from 22,889 hours of first-person human perspective video.
- **Robot-Specific Learning:** Training on a dataset of over 7,700 dual-arm robot operation samples (totaling 100 hours) involving 200+ daily items and 22 basic movements. This data synchronized video, robot state, natural language instructions, and tactile sensor data (force and deformation).
- **Fine-tuning:** Applying approximately 100 demonstration samples per specific task.

Background & Context

Human dexterity relies on the ability to instantaneously adjust movements based on force and slip felt by the fingertips. Previous AI models struggled with these nuances due to a lack of large-scale tactile datasets and the latency inherent in image recognition. T-Rex overcomes this by avoiding the need to restart image recognition during active contact, instead relying on the integrated tactile feedback loop.

Significance & Outlook

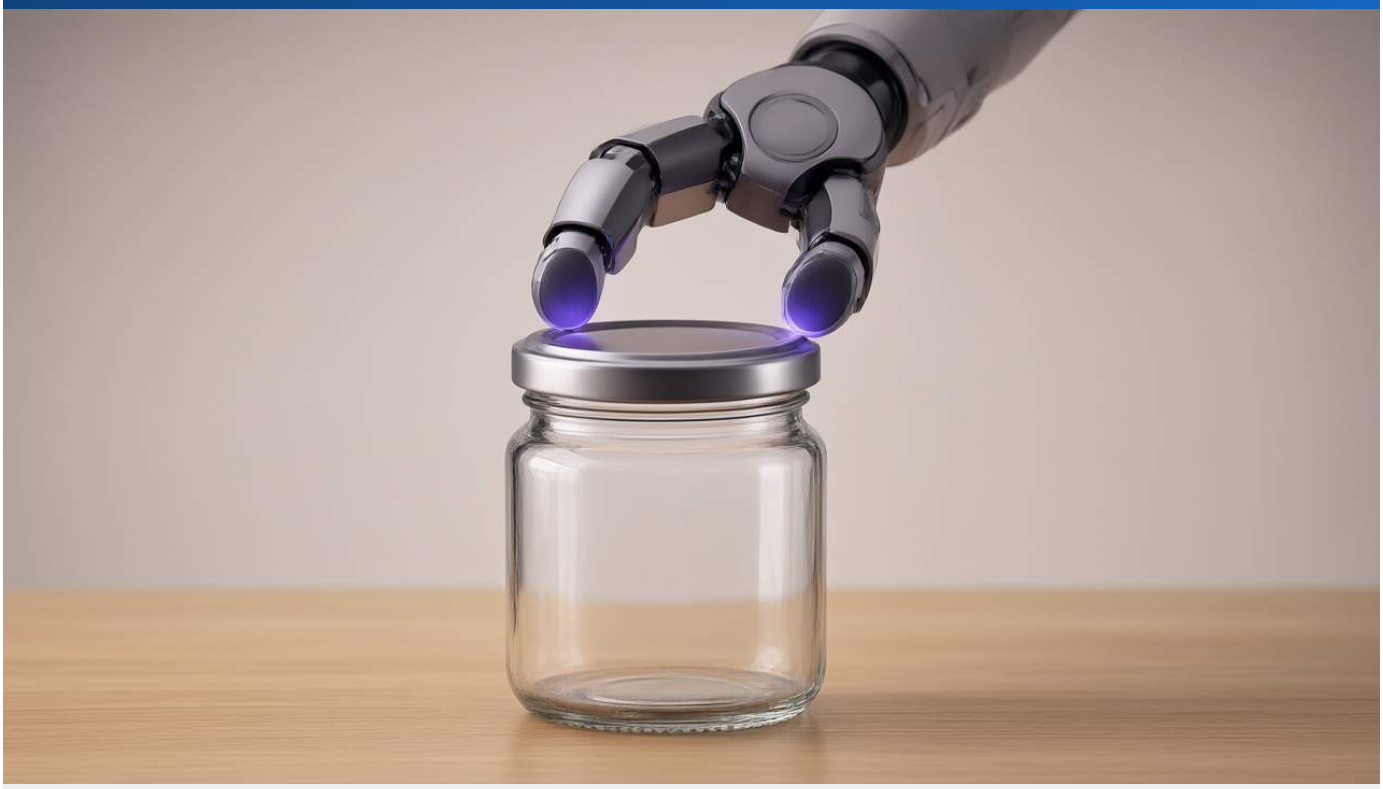
Panasonic HD intends to deploy this technology in industrial environments, specifically for inserting components in manufacturing and handling flexible materials in logistics. By automating tasks requiring precise force adjustments, the company seeks to reduce the burden on human workers and mitigate labor shortages.

Source: https://aismiley.co.jp/ai_news/panasonic-robot-manipulation-ai/

Collected: November 21, 2026 | Automated Research System (AI)

#07 LingBot-Touch: Robbyant's Open-Source Tactile Foundation Model

Published November 15, 2026 Robotics & Automation News China



OVERVIEW

Robbyant has open-sourced LingBot-Touch, a tactile foundation model pre-trained on nearly 5,000 hours of real-world data to provide robots with unified touch perception. The model improves task success rates by 14 to 26 percentage points across various action models, enabling high-precision manipulation regardless of the specific sensor hardware used.

IN DEPTH

Key Findings

Integrating LingBot-Touch into four different action models—LingBot-VLA, π0.5, Diffusion Policy, and T-Rex—resulted in average task success rate improvements of approximately 14 to 26 percentage points. In a specific test involving the Sharpa Wave hand unscrewing a bottle cap using T-Rex, the success rate increased from 56.25% (without tactile input) and 62.5% (with raw sensor signals) to 90% when using LingBot-Touch's tactile representation.

Technical Details

LingBot-Touch translates diverse signals from three mainstream sensing modalities—magnetic tactile, visual tactile, and piezoresistive sensing—into a unified tactile representation. The architecture utilizes separate encoding pathways for different sensing principles and maps contact points into a shared fingertip coordinate space to produce unified tactile tokens. This allows the model to learn contact location, force distribution, and temporal evolution.

The model is available in two sizes to balance performance with compute constraints:

- **LingBot-Touch-Tiny:** Contains approximately 5.3 million parameters. When integrated with LingBot-VLA, π0.5, and T-Rex, it increases total model size by only 0.13% to 0.16%.
- **Larger-capacity version:** Demonstrates higher potential in perception tests as pre-training data scales.

Background & Context

Tactile perception typically suffers from data incompatibility because different sensors produce different raw signals for the same physical contact. This tight coupling usually forces developers to re-collect data and retrain models whenever hardware changes. LingBot-Touch addresses this by decoupling the perception layer from the hardware, allowing data from human tactile gloves and teleoperated dexterous hands to be used jointly for training.

Significance & Outlook

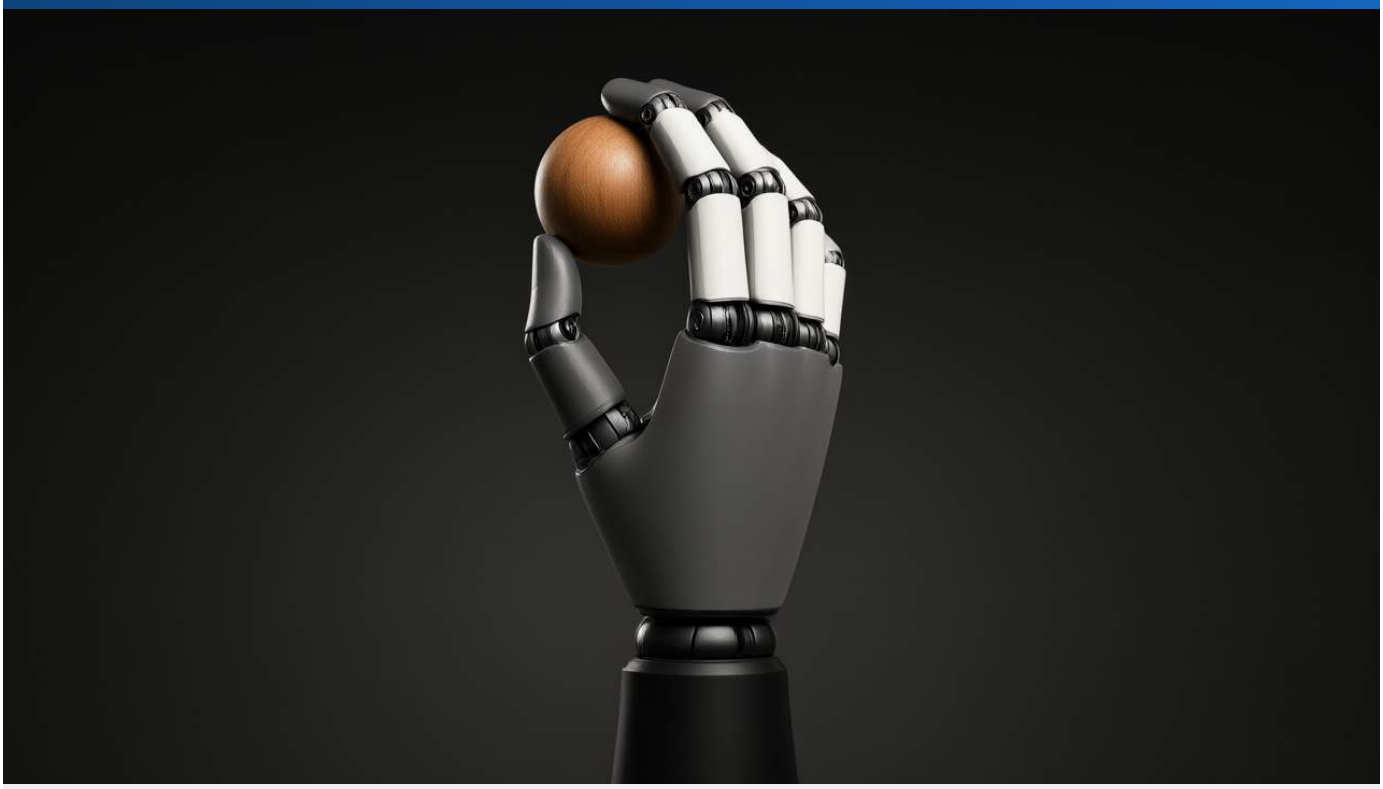
By serving as a general-purpose perception layer, LingBot-Touch enables robotics teams to retain their own action policies while switching hardware based on cost or task requirements. Robbyant has open-sourced the technical report and code via Hugging Face and GitHub, facilitating broader adoption of general-purpose embodied intelligence in tasks such as turning pages and identifying Mahjong tiles.

Source: https://roboticsandautomationnews.com/2026/11/15/robbyant-launches-lingbot-touch-to-give-robots-a-sense-of-touch/107152/

Collected: November 21, 2026 | Automated Research System (AI)

#08 XHAND 1 Pro-U: ROBOTERA's Dexterous Hand and GR00T 2 Integration

Published November 16, 2026 Unite.AI USA



OVERVIEW

ROBOTERA has launched the XHAND 1 Pro-U, a 16-degree-of-freedom dexterous robot hand designed to map directly to NVIDIA's DexUMI exoskeleton. In evaluations using GR00T 2, the system achieved success rates between 60% and 80% across three complex bimanual tasks, whereas previous models failed all tasks. This integration enables research teams to collect force-aware human demonstrations without occupying the robot.

IN DEPTH

Key Findings

The XHAND 1 Pro-U enables high-success execution of contact-rich bimanual tasks when paired with NVIDIA's GR00T 2. In specific evaluations, the system achieved a 60% success rate for banana-yogurt preparation, 80% for granola scooping, and 75% for fire chemistry. Notably, GR00T 1.7 and π0.5 completed none of these tasks despite using the same data recipe and DexUMI demonstrations.

Technical Details

The XHAND 1 Pro-U is a five-finger robot hand featuring 16 degrees of freedom. It is engineered to mirror the kinematics of the NVIDIA GEAR Lab’s DexUMI exoskeleton, allowing one-to-one mapping of joints to reduce motion conversion. The DexUMI hardware includes 15 magnetic encoders for joint tracking, an OAK wrist camera, and fingertip sensors for normal and shear force.

The workflow utilizes these recordings to post-train GR00T 2, which then executes skills on a dual-arm Tianji robot. To handle positional uncertainty, NVIDIA converts fingertip force data into joint torques; this lowers joint stiffness and offsets position targets, facilitating actions such as slicing, striking a match, and unscrewing lids.

Background & Context

ROBOTERA opened orders for an initial 40-unit release of the XHAND 1 Pro-U on November 16, 2026. The hardware's capabilities were demonstrated by Jim Fan at the Conference on Robot Learning (CoRL). To support the ecosystem, NVIDIA has published the DexUMI hardware designs under CC BY 4.0 and data-collection software under Apache-2.0, while XHAND robot-description files are MIT-licensed.

Significance & Outlook

The pairing of openly licensed capture hardware with a commercial hand allows developers to gather force-aware data without tying up the target robot during the demonstration phase. While the results show successful transfer across multiple complex sequences, the presence of unsuccessful trials indicates that consistent end-to-end performance remains the primary open question for broader deployment.

Source: https://www.unite.ai/robotera-opens-orders-for-xhand-1-pro-u-dexterous-robot-hand/

Collected: November 21, 2026 | Automated Research System (AI)

#09 NTT Physical AI: Physics-Based World Model for Robot Failure Prediction

Published November 18, 2026 AIsmiley Japan



OVERVIEW

NTT has developed a physical AI technology that predicts cargo collapse or drops before a robot executes a movement. By integrating a "physical control adapter" into a video generation model, the system improved success rates in simulated shelf-stacking tasks from 73.1% to 92.3%.

IN DEPTH

Key Findings

NTT has developed a physical AI technology capable of predicting and evaluating the outcomes of robotic actions, such as cargo collapse or falling objects, before they occur. In simulated shelf-stacking experiments using small robots, the implementation of this technology increased the task success rate from 73.1% to 92.3%. Additionally, the system demonstrated superior prediction accuracy over conventional methods in the "OBJ3D" public benchmark for video prediction involving multiple colliding objects, as measured by the LPIPS metric.

Technical Details

The technology utilizes a proprietary world model that explicitly handles physical quantities—including mass, position, posture, and velocity—to predict future states based on laws of physics and equations of motion. A core innovation is the "physical control adapter," which NTT has integrated into a video generation model for the first time. This adapter estimates physical properties from camera imagery and calculates subsequent movements based on physical laws, reducing errors such as object disappearance or deformation common in traditional world models.

The "NTT World Model" functions as a reinforcement layer for existing robot control software. It evaluates action candidates generated by "VLA" (which outputs actions from images and language) or "motion planners" (which calculate control for target goals). The system generates predicted future videos for each candidate action, allowing the robot to select the path that avoids collisions or collapses.

Background & Context

Conventional world models often rely heavily on massive datasets and fail to explicitly handle physical quantities, leading to inaccurate predictions of object interactions. In environments like airport baggage handling or courier services, where item shapes and weights vary wildly, collecting exhaustive training data is impractical. By basing predictions on physical laws rather than just data patterns, NTT's model can handle scenarios not present in its training sets.

Significance & Outlook

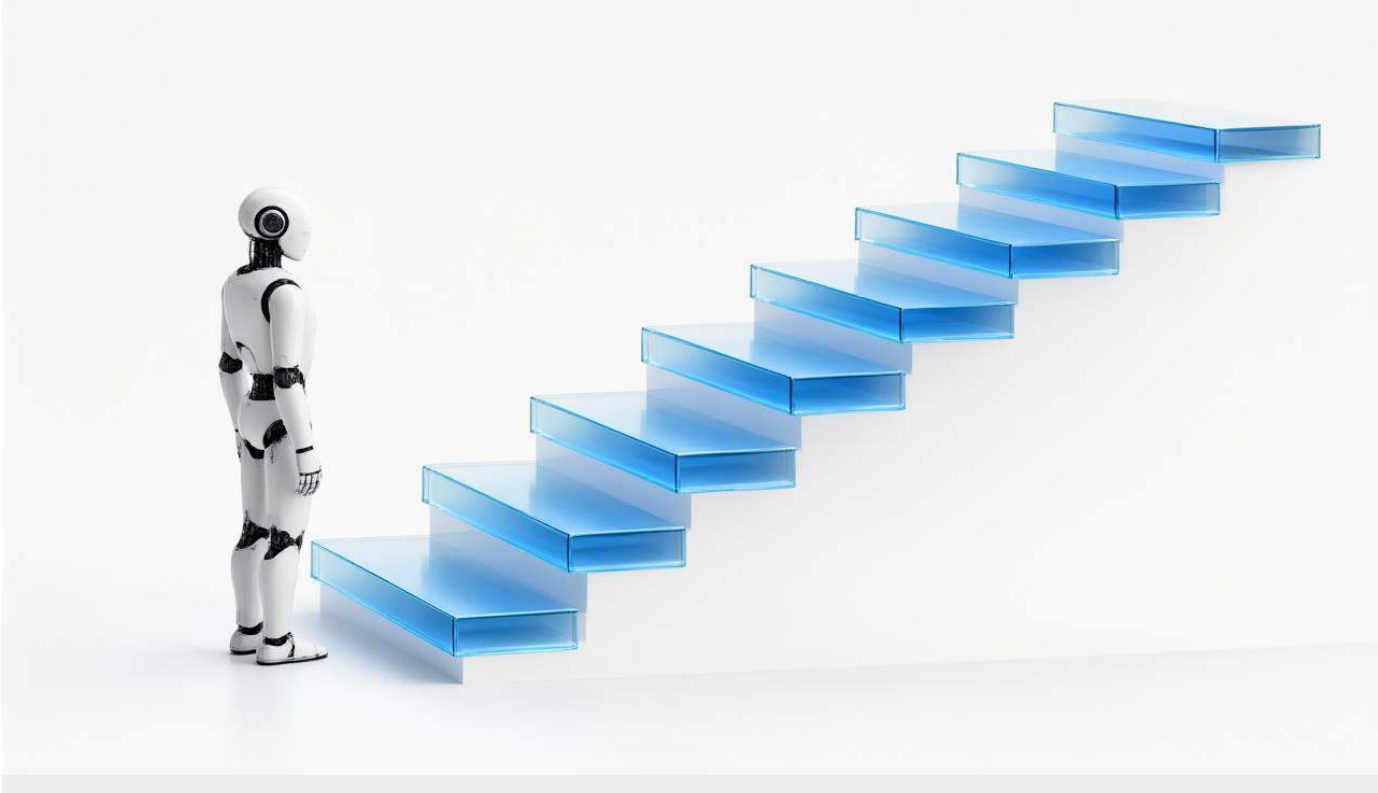
NTT intends to first apply this technology to the loading and unloading of diverse airport luggage. The company is collaborating with Mujin to advance social implementation and plans to partner with robot service vendors and logistics operators. Future expansion is planned for the manufacturing, construction, and retail sectors to address labor shortages and improve productivity.

Source: https://aismiley.co.jp/ai_news/ntt-physical-ai-world-model/

Collected: November 21, 2026 | Automated Research System (AI)

#10 MIIT Humanoid Robot Standards: 5 New Frameworks for 2026

Published November 17, 2026 澎湃新闻 China



OVERVIEW

China's Ministry of Industry and Information Technology (MIIT) has released five standards for humanoid robots covering intelligence levels, hardware specifications, and training data. These standards establish a grading system from L0 to L5 and unify technical requirements for integrated joints and dexterous hands to improve integration efficiency.

IN DEPTH

Key Findings

The Ministry of Industry and Information Technology (MIIT) issued Announcement No. 30 of 2026 on November 16, officially implementing five standards for humanoid robots. Managed by the Humanoid Robot and Embodied Intelligence Standardization Technical Committee (TC8), these standards address three primary domains: intelligence capability evaluation, critical components, and robot training.

Technical Details

The released standards are categorized as follows:

- **Intelligence Capability:** The "Humanoid Robot Intelligence Capability Grading" establishes a framework from L0 to L5. This grading is based on four dimensions: perception and cognition, decision-making and learning, execution performance, and collaborative interaction.
- **Critical Components:**
  - The "Humanoid Robot Electric Drive Integrated Joint Technical Specification" defines interfaces, performance indicators, and testing methods for core joints in the torso and legs.
  - The "Humanoid Robot and Embodied Intelligence Dexterous Hand Technical Specification" covers design, testing, evaluation, and delivery to resolve issues regarding non-unified interfaces and low integration efficiency.
- **Training and Data:**
  - The "Humanoid Robot Training Ground Construction Technical Specification" specifies functional zoning, spatial layout, equipment, data collection, communication networks, and safety protection to link simulation and real-machine verification.
  - The "Humanoid Robot Training Data Management Requirements" defines the full lifecycle of data, including collection, preprocessing, labeling, quality evaluation, storage, circulation, use, and destruction.

Background and Context

The standards were announced via the TC8 committee secretariat on November 17. The data management framework specifically aims to unify data formats, labeling rules, and quality evaluation methods while enhancing privacy protection, data security, and process traceability.

Significance and Outlook

These frameworks provide a verifiable basis for product R&D, testing, and scenario adaptation. Moving forward, the TC8 committee intends to promote the application of these standards by integrating them with detection certifications, training platforms, data ecosystems, and typical application scenarios.

Source: https://www.thepaper.cn/newsDetail_forward_34492647

Collected: November 21, 2026 | Automated Research System (AI)

#11 Huawei Cloud CloudRobo-WM1.2: Embodied World Model Specs

Published November 16, 2026　钛媒体（腾讯新闻）　China



OVERVIEW

Huawei Cloud has open-sourced CloudRobo-WM1.2, an embodied world model native to Ascend computing that ranks first in RoboTwin 2.0 and Libero Pro 2.0 benchmarks. The release introduces a three-tier open ecosystem and a full-stack native Ascend infrastructure to reduce dependency on CUDA and TPU ecosystems.

IN DEPTH

Key Findings

Huawei Cloud has released CloudRobo-WM1.2, an embodied world model developed natively on Ascend computing. The model achieved top rankings in the RoboTwin 2.0 and Libero Pro 2.0 benchmarks. To foster an ecosystem, Huawei is open-sourcing the model weights, post-training code, and inference code, while providing targeted access to training framework engineering code and the WAM Ascend computing library for core partners.

Technical Details

CloudRobo-WM1.2 addresses several industry bottlenecks through five core technical capabilities:

- **Perception:** The PPA (Perceive-Predict-Act) architecture integrates RGB video, semantic features, depth information, and point clouds to predict future states rather than just describing current frames.
- **Action Generation:** The DualAct architecture utilizes a "World generator" for high-precision prediction and an "Action expert" for efficient direct generation.
- **Data Efficiency:** A multi-granularity adaptive pre-training framework allows the model to utilize heterogeneous data even when modalities are incomplete or camera angles are inconsistent.
- **Cross-Embodiment Generalization:** The model uses Embodiment conditioning to maintain original physical semantics for 96-dimensional robot and 168-dimensional human movements, avoiding crude numerical merging.
- **Compute Optimization:** Four elastic inference modes allow compute loads to scale between 3.99 and 43.71 TFLOPS depending on whether the priority is laboratory precision or production efficiency.

Background and Infrastructure

The model is built on a three-layer base: a compute layer using heterogeneous architecture and super-node interconnects; a network/storage layer for PB-level multimodal data; and an AI framework layer where RLinf v0.4 provides up to 2.78x throughput improvement on Ascend NPUs. Additionally, Huawei integrates six engineering capabilities, including high-fidelity physical simulation, Real2Sim2Real migration, and HarmonyOS integration via R2C gateways supporting over 1,000 concurrent robots.

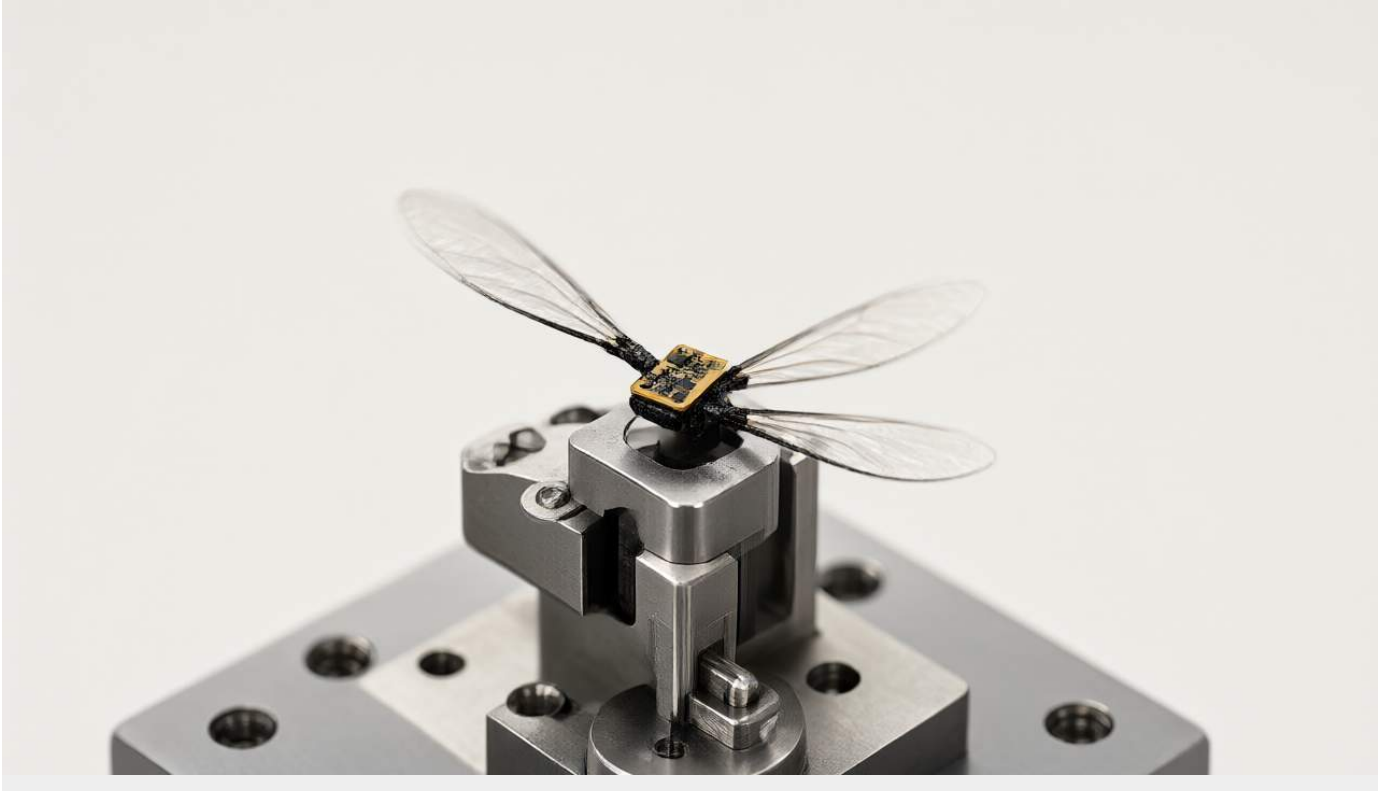
Significance

By providing a full-stack alternative to NVIDIA CUDA and Google TPU, Huawei Cloud aims to offer "certainty" for the Chinese robotics industry. The strategy shifts competition from raw model scale to scenario-specific innovation and data quality, while validating the ability of domestic compute to handle the highest AI workloads.

Source: https://news.qq.com/rain/a/20261116A0CCMV00

#12 MIT Microrobot: Onboard Sensing for Motion-Capture-Free Flight

Published November 18, 2026 Unite.AI USA



OVERVIEW

MIT researchers have developed a 1.29-gram flapping-wing robot capable of hovering and landing using onboard sensing and computation. By increasing actuator size to support a 244-milligram electronics package, the system achieves centimeter-scale positional accuracy without external motion-capture systems.

IN DEPTH

Key Findings

MIT researchers have demonstrated a 1.29-gram aerial microrobot that achieves sensory and compute autonomy, allowing it to hover, follow trajectories, and land without relying on external motion-capture systems. In a 30-second experiment, the robot successfully avoided obstacles and landed on a sunflower. While the robot handles low-level flight control and estimation onboard, it currently requires power from an offboard source and high-level commands from a human operator via joystick.

Technical Details

To accommodate the necessary electronics, the team increased the radius and length of the soft actuators (artificial muscles) by 50%, which boosted net lift force by 46% and resulted in a lift-to-weight ratio of 1.9. This additional lift supports a 244-milligram electronics package mounted on a fiberglass substrate to mitigate vibrations. The sensor suite consists of:

- An inertial measurement unit (IMU) for attitude.
- An optical-flow sensor for lateral speed and position.
- A time-of-flight (ToF) sensor for height.

To manage computational costs and avoid drift caused by the lack of an absolute-position reference, the team implemented a simplified estimator. They determined that continuous estimates at a faster rate were more effective for this flight system than slower, more accurate estimates.

Background & Context

This system evolves from a December 3, 2025, report of a robot capable of performing 10 somersaults in 11 seconds. However, that previous iteration relied on an external computer for its AI-based controller. The current 2026 iteration integrates the navigation sensing and computation directly onto the aircraft.

Significance & Outlook

Potential applications for this technology include precision pollination, pest detection, crop-health monitoring, and industrial surveillance in environments where larger machines are impractical. Future development focuses on adding a camera for autonomous object recognition and obstacle avoidance, as well as integrating batteries and power electronics to enable untethered outdoor flight.

Source: https://www.unite.ai/mit-microrobot-flies-without-motion-capture-using-onboard-sensors/

Collected: November 21, 2026 | Automated Research System (AI)

#13 Mitsubishi Electric LiDAR: 600m detection for rail automation

Published November 18, 2026　日本経済新聞　Japan



OVERVIEW

Mitsubishi Electric has developed a high-performance LiDAR sensor capable of detecting objects 600 meters away, with commercialization planned for fiscal 2027. The system identifies obstacles as small as 20 centimeters to support the transition toward autonomous train operations.

IN DEPTH

Key Findings

Mitsubishi Electric is developing a long-range LiDAR (Light Detection and Ranging) sensor specifically for railway vehicles, targeting a product launch in fiscal 2027. The sensor can detect the presence of people or fallen objects approximately 20 centimeters in size at a distance of 600 meters. According to the company, this is a world-first achievement for railway-specific LiDAR.

Technical Details

The system utilizes laser light to measure the distance and shape of target objects. To enhance detection capabilities, Mitsubishi Electric is integrating the LiDAR with cameras to create a "forward monitoring system." This system incorporates artificial intelligence (AI) for object detection, allowing the system to classify the type of obstacle—such as a person or a vehicle—which is difficult to identify using sensors alone.

Background and Context

The requirement for a 600-meter detection range is driven by the physics of railway braking; trains require significantly longer distances to come to a complete stop compared to road vehicles. For comparison, automotive LiDAR typically reaches a maximum detection distance of approximately 300 meters. The development comes amid a critical shortage of train drivers, increasing the necessity for autonomous driving technologies in the rail sector.

Significance and Outlook

The company recently demonstrated the technology at the Mitsubishi Heavy Industries railway technology test center in Mihara City, Hiroshima Prefecture, where it is currently verifying sensing performance using test vehicles. While the primary target is the railway market, Mitsubishi Electric intends to pursue opportunities in infrastructure monitoring for airports and roads. The integration of AI-driven classification and extended-range sensing is positioned as a key enabler for the automation of rail transport.

Source: https://www.nikkei.com/article/DGXZQOCC186M90Y6A111C2000000/