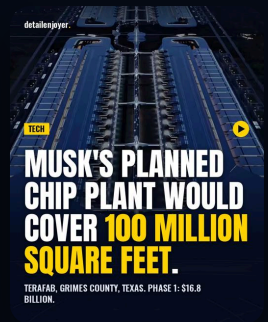
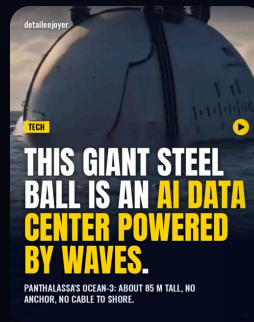
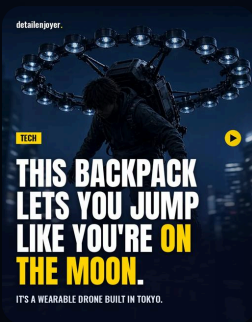




COLLECTION · COL-04

MACHINES OF TOMORROW

Robots, robot arms that carve marble, braided robot muscles, flying fans, new factories, AI road cameras, sails pushed by sunlight, turbines lifted by helium, an uncrewed combat jet, drones that knock ice off power lines, a wingless eVTOL prototype, robots that build a lunar test tower, a soft gripper shaped like an octopus arm, a droid trained in simulation and a virtual prison that exists only as a concept.



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ABOUT THIS COLLECTION

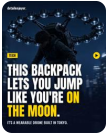
22 case files on new machines that are being built, tested, raced or rolled out today. The 2026 World Humanoid Robot Games in Beijing drew 2,056 robots from 666 teams in 16 countries, about four times as many robots as the 2025 Games. **DD-023** RLP (Rapid Liquid Printing), from MIT's Self-Assembly Lab, prints liquid rubber, foam or plastic inside a tank of gel instead of layer by layer in air. **DD-013**

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RoboClassical

DD-722 · Tech / History · Robot arms carving marble statues from 3D scans.

13



RoboWeaving

DD-716 · Tech / Science · Braiding fibers into soft robot muscles.

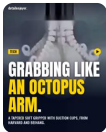
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Drone De-icing

DD-699 · Tech / Nature · Ice-breakers with propellers.

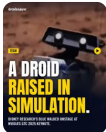
15



Octopus Robo-Grip

DD-601 · Tech / Science · Grabbing like an octopus arm.

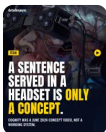
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NVIDIA's Blue

DD-614 · Tech · A droid raised in simulation.

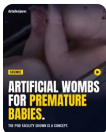
17



A Prison for Your Mind

DD-305 · Tech / People · A prison sentence served inside a headset is only a concept so far.

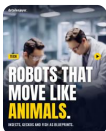
18



Ectogenesis

DD-324 · Science / Tech · Artificial wombs are being tested to help extremely premature babies.

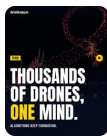
19



BioInspired Robots

DD-082 · Tech / Nature · Engineers copy insects, birds and fish to build better robots.

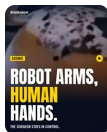
20



Drone Swarms

DD-437 · Tech · A drone swarm coordinates dozens or thousands of drones at once.

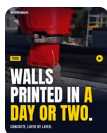
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AI Surgery

DD-408 · Science / Tech · Robotic systems let surgeons operate through tiny incisions.

22



Print Your Home

DD-440 · Tech · Giant 3D printers can lay down a house's walls in about a day or two.



Collection Quiz and Answer Key

44 questions from every case file

Every quick fact has a stable ID (for example DD-023-F01) and comes from a case file with its sources listed. Online edition with videos and slides: <https://detailenjoyer.com/collections/machines-of-tomorrow/>



DD-023 TECH · 1 OF 22

WHRGS 2026

The 2nd World Humanoid Robot Games ran Aug 22–26, 2026 at Beijing's National Speed Skating Oval, with 2,056 robots from 666 teams in 16 countries. That's about four times as many robots as the 2025 Games. The rules now required full autonomy in most competitive events, and the job-style 'scenario' events moved into real factories, hotels and model homes.

QUICK FACTS

DD-023-F01

The 2026 World Humanoid Robot Games in Beijing drew 2,056 robots from 666 teams in 16 countries, about four times as many robots as the 2025 Games.

DD-023-F02

At the 2026 World Humanoid Robot Games, a fully autonomous run in a scenario event scored double a remote-controlled one (1.0 vs 0.5).

THE WRITE-UP

Five days on the 'Ice Ribbon'. The 2nd World Humanoid Robot Games ran Aug 22–26, 2026 at the National Speed Skating Oval (the 'Ice Ribbon') in Beijing.

2,056 robots, 666 teams. 2,056 robots from 666 teams in 16 countries took part. Reuters notes that most of the teams were Chinese.

Four times bigger in a year. The first Games, in August 2025, drew 280 teams and just over 500 robots. That means the robot count roughly quadrupled in a year, and the number of teams rose 138%.

Autonomy became the rule. Except for the 100 m and 400 m obstacle races, every track event and other competitive event had to be completed fully autonomously. In scenario events, a fully autonomous run scored with a weighting of 1.0, while a teleoperated run counted only 0.5.

From demos to real jobs. The 51 events (more than 1,300 matches) included job-style tasks in real factories, hotels and model homes, plus household, industrial and emergency-rescue scenarios. Organizers said the aim was to push humanoids from 'demonstration tools' toward 'practical productivity'.

Faster than Bolt. In a 100 m preliminary, Team Tianzhuo's robot ran 9.39 s, beating Usain Bolt's 9.58 s world record. The 2025 Games' best time was 21.5 s. Reuters reports that Tiangong Ultra then won the final in 8.64 s.

Dexterity and teamwork. Football moved up from 3v3 to 5v5, which tests multi-robot coordination and perception. Events like touhu (traditional pitch-pot) test dexterity and manipulation. In power-tool assembly, team LinkerBot fully autonomously installed 18 screws in five minutes.

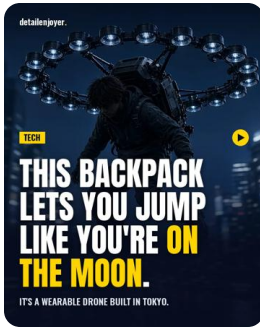
REEL VS. RECORD

- **Note:** No factual errors found. 'More than 2,000 robots from 666 teams' matches the official figures (2,056 robots, 666 teams, 16 countries). [Xinhua; CGTN; Beijing gov't]
- **Context:** the official name is the '2nd World Humanoid Robot Games'. The 2026 edition was the second, after August 2025. [Xinhua]
- **Context:** the Reel's 'shift toward autonomy' is borne out by the rules. Full autonomy was required in all competitive events except the two obstacle races, and teleoperated scenario runs counted at half weight. [Beijing gov't; People's Daily]

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6. A closer look at second World Humanoid Robot Games (People's Daily Online, Aug 31, 2026): <https://en.people.cn/n3/2026/0831/c90000-20494223.html>
7. 2nd World Humanoid Robot Games: Highlights & Ticket Info (Beijing municipal gov't, Aug 15, 2026): https://english.beijing.gov.cn/latest/news/202608/t20260815_4824032.html

Permalink: <https://detailenjoyer.com/case/whrg-2026/> · Last updated Aug 27, 2026



DD-007 TECH · 2 OF 22

GRAVITY, OR LUNAVITY?

A University of Tokyo team built a 16-fan wearable drone that makes jumping feel like you're on the Moon.

QUICK FACTS

DD-007-F01

Lunavity is a wearable drone that holds up part of the wearer's weight while they jump; its name is a nod to the Moon.

DD-007-F02

Lunavity was built by students from Jun Rekimoto's lab at the University of Tokyo and unveiled in 2018.

DD-007-F03

Lunavity uses a ring of 16 electric ducted fans above the wearer that push air down for lift.

DD-007-F04

Lunavity is not a jetpack: it lightens the wearer so every jump goes higher and lasts longer.

DD-007-F05

Lunavity has no joystick; it follows the wearer's body.

DD-007-F06

Lunavity aims to make jumping feel like walking on the Moon, where gravity is about 1/6 of Earth's.

DD-007-F07

The Lunavity team pitched the wearable drone for slam dunks, jumping across streets and brand-new sports.

DD-007-F08

A Lunavity prototype was shown at SXSW 2018 in Austin, with no price or release date.

THE WRITE-UP

Lunavity. A wearable drone that holds up part of your weight while you jump. The name is a nod to the Moon.

University of Tokyo. Built by students from Jun Rekimoto's lab and unveiled in 2018.

16 ducted fans. A ring of electric fans above the wearer pushes air down for lift.

Not a jetpack. It doesn't fly you around. It lightens you, so every jump goes higher and lasts longer.

No joystick. It follows your body, so you just jump the way you normally would.

Moon mode. The goal: feel like you're walking on the Moon, where gravity is about 1/6 of Earth's.

Slam dunks. The team pitched it for dunking, jumping across streets and brand-new sports.

SXSW 2018. A prototype hit the show floor in Austin, with no price or release date.

SOURCES

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9. NASA NSSDC: Moon fact sheet: <https://nssdc.gsfc.nasa.gov/planetary/factsheet/moonfact.html>

Permalink: <https://detailenjoyer.com/case/lunavity/> · Last updated Oct 17, 2026



RAPID LIQUID PRINTING (RLP)

RLP stands for Rapid Liquid Printing, a 3D-printing method developed at MIT's Self-Assembly Lab. Instead of stacking thin layers in air, a nozzle on a robot or CNC machine draws liquid rubber, foam or plastic freely in 3D inside a tank of granular gel. The gel holds the wet material in place until it cures. Then the part is lifted out and rinsed with water. Prints take seconds to minutes rather than hours, and they can be as big as furniture.

QUICK FACTS

DD-013-F01

RLP (Rapid Liquid Printing), from MIT's Self-Assembly Lab, prints liquid rubber, foam or plastic inside a tank of gel instead of layer by layer in air.

DD-013-F02

Rapid Liquid Printing can make a complex object in seconds to minutes, and objects up to the size of furniture.

THE WRITE-UP

What RLP stands for. RLP is Rapid Liquid Printing, an experimental additive manufacturing process from MIT's Self-Assembly Lab. It was developed with designer Christophe Guberan and the furniture maker Steelcase.

Drawing inside gel. A nozzle 'draws' liquid material in 3D inside a tank of granular gel. The gel acts as a reusable support, holding the material in place while it cures.

Not layer by layer. Ordinary 3D printers build in flat layers. An RLP machine can print freely in any direction, so it doesn't need support structures for overhangs.

Real industrial materials. RLP can use any one- or two-part material that cures by light or chemistry, including industrial-grade rubbers, foams and plastics.

Big and fast. Prints range from inches to many feet. A complex object takes seconds to minutes rather than hours or days, and a whole piece of furniture can be printed.

Rinse and done. When printing finishes, the part is lifted out of the tank and washed with water. Inflatable prints can then be inflated, deflated and inflated again.

From lab to company. The process is now being commercialised by Rapid Liquid Print Co. for elastomer parts, which it calls 'Gravity Free Manufacturing'. Its prints go straight into a suspension gel with no molds.

REEL VS. RECORD

- **Overstated:** 'formed almost instantly'. MIT says prints take seconds to minutes, and the material still has to cure before the part comes out of the gel. [MIT DSpace paper; MIT Self-Assembly Lab]
- **Confirmed:** RLP means Rapid Liquid Printing. It is additive manufacturing that extrudes liquid into an engineered (granular) gel suspension, makes large, soft objects, and does not build layer by layer. [MIT Self-Assembly Lab; MIT DSpace paper; Rapid Liquid Print Co.]
- **Nuance:** RLP isn't limited to soft objects. It also handles rigid plastics, but soft rubbers and foams are its best-known demos.

SOURCES

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Permalink: <https://detailenjoyer.com/case/rapid-liquid-printing/> · Last updated Jun 18, 2026



DD-022 TECH · 4 OF 22

OCEAN-3

Ocean-3 is Panthalassa's series of wave-powered, floating AI computing nodes. Each one is an 85 m plate-steel structure shaped like a golf ball on a tee. As it bobs, seawater is driven up an internal tube to spin a turbine, which powers onboard GPUs. The nodes have no anchor and no power cable. They steer themselves, and they send results to shore by satellite. Pilot units were planned for the northern Pacific in 2026, with commercial deployments targeted for 2027.

QUICK FACTS

DD-022-F01

Panthalassa's Ocean-3 nodes are 85 m steel floating data centers that make their own power from waves and send AI results to shore by satellite.

DD-022-F02

Ocean-3 nodes have no anchor and no shore cable. They are self-propelled, and their CEO compares them to a giant Roomba.

THE WRITE-UP

A data center that floats. Ocean-3 is Panthalassa's series of autonomous nodes. They are designed to run AI inference computing at sea, powered by electricity they make from ocean waves.

About 85 meters of steel. Each node is about 85 m tall and made of plate steel, close to the height of Big Ben. New Scientist describes it as shaped like 'a golf ball sitting on a tee'.

How the waves make power. The 'tee' is a long tube open at the bottom. As waves lift and drop the node, seawater is pushed up the tube into the hollow, air-filled sphere, where it spins turbines. That electricity runs the onboard GPUs and satellite equipment.

No anchor, no cable. The nodes are self-propelled and aren't tethered to the seabed or connected to shore by a cable. They get towed out and then propel themselves to their station. CEO Garth Sheldon-Coulson calls it 'like a little Roomba, except it's enormous'.

Answers by satellite. Instead of sending power to shore, each node computes on board and sends its results (inference tokens) to customers by satellite link.

\$140 million from Thiel and others. On May 4, 2026, Panthalassa announced a \$140 million Series B led by Peter Thiel. The money will finish a pilot factory near Portland, Oregon, and speed up Ocean-3 deployment.

Prototypes first, pilots next. Earlier prototypes (Ocean-1 in 2021, then Ocean-2 and Wavehopper in 2024) proved power generation, propulsion and computing at sea. The Ocean-3 pilot series was planned for the northern Pacific in 2026, with commercial deployments targeted for 2027.

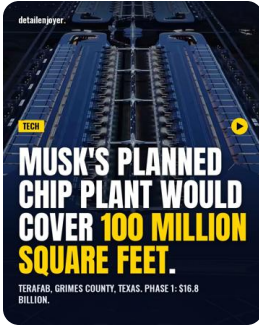
REEL VS. RECORD

- **Timing caveat:** the Reel describes Ocean-3 as if it's already running. In reporting through Aug 2026, the Ocean-3 pilots were still planned for the northern Pacific in 2026, with commercial deployments targeted for 2027. I couldn't confirm that a node has processed AI workloads offshore yet. [Panthalassa press release; Ars Technica; Fast Company]
- **Minor:** '85-meter-tall' matches most outlets. Ars Technica (citing the FT) says 'about 85 meters in length'. It's the same figure for the vertical node. [Ars Technica; New Scientist; Latitude Media]
- **Minor:** sources describe 'an internal turbine' (DCD, Latitude) or 'turbines' (New Scientist). The Reel's 'across turbines' is fine.

SOURCES

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Permalink: <https://detailenjoyer.com/case/ocean-3/> · Last updated Aug 25, 2026



DD-016 TECH · 5 OF 22

TERAFAB

TeraFab is the AI-chip complex that SpaceX and Tesla plan to build in Grimes County, Texas. It would make, package and test logic and memory chips under one roof. Texas announced the first phase on Aug 6, 2026: more than \$16.8 billion, 3,000 jobs and a 100-million-square-foot facility. Tax filings sketch four phases worth up to about \$119 billion, but the later phases aren't committed.

QUICK FACTS

DD-016-F01

Terafab, SpaceX and Tesla's planned chip complex in Grimes County, Texas, would span 100 million square feet, with a first phase of more than \$16.8 billion.

DD-016-F02

Terafab's tax filings sketch four phases worth up to about \$119 billion, but only the \$16.8 billion first phase has been announced.

THE WRITE-UP

A chip plant in Grimes County. On Aug 6, 2026, Texas Governor Greg Abbott announced that SpaceX will build Terafab, a vertically integrated semiconductor fabrication plant, in Grimes County, about 20 miles east of College Station, near Gibbons Creek Reservoir.

Everything under one roof. Terafab is meant to make, package and test advanced logic and memory chips in one place. In Musk's words, it combines 'logic, memory, and advanced packaging all under one roof'.

\$16.8 billion to start. The first phase is a capital investment of more than \$16.8 billion with 3,000 new jobs. The total is about \$10.37 billion in the Anderson-Shiro district plus \$6.43 billion in the Lola district. Texas added a \$30 million Texas Enterprise Fund grant.

100 million square feet. The planned facility covers 100 million square feet. The chips are meant for Tesla's Optimus robots and Cybercabs and for SpaceX's space-based data centers.

Up to \$119 billion, if every phase gets built. State tax-incentive filings describe four phases (2026–28, 2029–31, 2032–34, 2035–36) totalling about \$119.4 billion. The applicant says it will decide on each later phase only after finishing the one before.

Who's behind it. The filings were made by TeraFab AI, LLC, a SpaceX-linked entity. ENR describes the project as led by affiliated companies including SpaceX, Tesla and xAI.

Timeline. First-phase construction is projected for 2026–28, with commercial operations expected to begin in 2028.

REEL VS. RECORD

- **Nuance:** '\$119 billion' is a potential total across four phases in tax-incentive filings, not committed spending. SpaceX says it will decide on phases 2–4 only after each earlier phase is finished. [ENR source guide; KBTX; ENR]
- **Nuance:** the governor's announcement names SpaceX. Reuters reports SpaceX and Tesla, and the filings come from SpaceX-linked TeraFab AI, LLC, with ENR naming SpaceX, Tesla and xAI. 'SpaceX and Tesla's' is fair shorthand. [Texas Governor; Reuters; KBTX; ENR]
- **Confirmed:** Grimes County, vertical integration (logic, memory, packaging, testing), the \$16.8B first phase and 100 million sq ft. 'More than \$16.8 billion' is the official wording. [Texas Governor; Reuters]

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Permalink: <https://detailenjoyer.com/case/terafab/> · Last updated Aug 9, 2026



THE FLOCK

Flock Safety, an Atlanta company, makes automated license plate reader (ALPR) cameras. Each one snaps still images of passing cars, using infrared at night. Machine learning turns each image into searchable data: the plate, whether full, partial or missing, plus make, color, damage, bumper stickers and roof racks, which Flock calls a 'Vehicle Fingerprint'. It also records time and place. Matches against police hotlists trigger alerts. By the end of August 2026, more than 80% of the 137,000-plus ALPR cameras mapped across the U.S. were Flock's, according to crowdsourced data cited by the Congressional Research Service. That scale, and warrantless searches across agencies, has drawn privacy scrutiny.

QUICK FACTS

DD-030-F01

Flock Safety cameras record more than plates: a 'Vehicle Fingerprint' of make, color, damage and even bumper stickers.

DD-030-F02

More than 80% of the 137,000-plus license-plate-reader cameras mapped in the U.S. by August 2026 were Flock's.

THE WRITE-UP

Who makes them. 'Flock' cameras are made by Flock Safety, an Atlanta-based company. Its lineup ranges from standard and long-range roadside readers to portable units and trailers.

Who uses them. Customers include law enforcement agencies, businesses, neighborhoods and homeowner groups, apartment complexes, houses of worship and schools. Private users can share footage with police.

Snapshots, not video. The original Falcon camera is solar-powered, motion-activated and connected over LTE. It wakes in under a tenth of a second and captures several still frames of a car moving at up to 75 mph. Infrared gives readable plates at night.

A 'Vehicle Fingerprint'. Machine learning extracts plate number and state (even partial or missing plates), make, type, color, damage and add-ons. Reporters have documented searches by bumper stickers and bike racks.

Hotlists and alerts. Each read is checked against national (NCIC) or custom hotlists, and a match alerts officers in real time. Searches can span agencies that opt into Flock's network.

The biggest network. By the end of August 2026, crowdsourced mapping counted more than 137,000 ALPR cameras in the U.S., over 80% of them Flock's. Flock says its network spans 49 states.

Privacy debate. Flock says its readers don't use facial recognition and that customers control their own data. Critics point to warrantless nationwide lookups and possible misuse, and Congress is now weighing oversight.

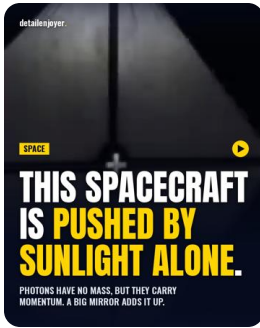
REEL VS. RECORD

- **Confirmed from the frames:** the Reel is about Flock Safety's ALPR cameras (caption at 0.8–4.2 s). The company's own footage is used (credit 'flock'). [Flock product page; Business Insider]
- **Name:** 'Flock safety cameras.' The company is Flock Safety (capitalized), and its plate readers are sold as Flock LPR (originally the Falcon camera). [Flock; Bristol RI FAQ]
- **Imprecise:** 'to monitor vehicle traffic.' The cameras take motion-triggered still snapshots of each passing vehicle rather than streaming continuous traffic video. [Bristol RI FAQ; DHS ALPR survey]
- **Nuance:** 'mounted on poles or roadside infrastructure.' The Falcon is solar-powered and LTE-connected, sold as 'infrastructure-free', and usually goes on its own pole. [Bristol RI FAQ]
- **Omission:** reads are stored with location and are searchable across agencies, often without a warrant. This has drawn privacy and congressional scrutiny, which the Reel doesn't mention. [CRS 2026; Texas Tribune]

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Permalink: <https://detailenjoyer.com/case/the-flock/> · Last updated May 19, 2026



DD-039 SPACE / TECH · 7 OF 22

SOLAR SAILING

Light has no mass but does carry momentum. When photons bounce off a mirror-like sail, they push it twice: once when they arrive and again when they reflect. The force (solar radiation pressure) is tiny, so sails have to be huge and spacecraft light. In the vacuum of space, though, the push never stops. Japan's IKAROS first flew a solar sail between planets in 2010. The Planetary Society's LightSail 2 showed a CubeSat could raise its orbit with sunlight, and NASA's ACS3 (launched April 23, 2024) is testing lightweight carbon-fiber booms for an 80 m² sail. By tilting the sail, a craft can speed up, slow down or 'tack' to change its orbit.

QUICK FACTS

DD-039-F01

Photons have no mass but carry momentum, so a mirror-like sail gets pushed twice: once when light hits it and again when it bounces off.

DD-039-F02

LightSail 2's sunlight push was only about 0.058 mm/s², but after a month that adds up to about 550 km/h.

THE WRITE-UP

Massless but pushy. Photons have no mass, but they carry momentum. When they hit a mirror-like sail they push it once on arrival and again as they bounce off.

Light, not wind. The push comes from solar radiation pressure, not the solar wind. The solar wind's charged particles push with less than one percent as much force, roughly a thousandth.

Tiny but relentless. LightSail 2's 32 m² sail gave it an acceleration of about 0.058 mm/s². That's tiny, but over a month it adds up to about 550 km/h (341 mph).

Steering by tilting. By angling the sail, a spacecraft can tack like a sailboat, or turn it against its direction of travel to slow down and lower its orbit. ACS3 tests both raising and lowering its orbit.

Pioneers. JAXA's 14-m IKAROS, launched in 2010, was the state of the art in solar sailing. LightSail 2 later showed that small spacecraft can change their orbits with sunlight.

ACS3. NASA's ACS3 launched on April 23, 2024. Four carbon-fiber composite booms unroll from a CubeSat and stretch a sail about 9 m (30 ft) per side, roughly 80 m² in total.

REEL VS. RECORD

- **Confirmed:** 'each photon has no mass' but carries momentum, and reflective sails turn that into thrust. [Planetary Society; Astronomy]
- **Incomplete:** 'gradually accelerating the spacecraft.' Sails can also slow a craft down and lower its orbit by angling the sail against its direction of travel, and ACS3 tests both. [Planetary Society; NASA NTRS]
- **Caveat:** 'without the need for fuel' is true for propulsion (no rocket propellant), but the push weakens with distance from the sun. [NASA ACS3; Astronomy]
- **Clarification:** the push comes from sunlight (radiation pressure), not the solar wind, which pushes with less than one percent as much force. [Planetary Society; NASA NTRS]
- **Footage note:** the animation shows a four-boom diamond sail unfolding from a small satellite over Earth. That's the layout of NASA's ACS3, but the Reel credits only 'galaxies' and doesn't name the mission. [frames; NASA ACS3]

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Permalink: <https://detailenjoyer.com/case/solar-sailing/> · Last updated Sep 27, 2025



AIRBORNE WIND TURBINES

The footage shows the helium-filled aerostats of Beijing-based SAWES Energy Technology (Linyi Yunchuan). The S1500 prototype flew at 1,500 m in Hami, Xinjiang, on September 19–23, 2025. The S2000 is a 60 × 40 × 40 m ducted airship of nearly 20,000 m³ carrying 12 turbines. On January 5, 2026, in Yibin, Sichuan, it climbed to 2,000 m in about 30 minutes, generated 385 kWh and fed it into the local grid through its tether, which the company calls a world first. Because wind power rises with the cube of wind speed, steadier high-altitude wind promises more energy from lighter hardware. The S1500's 1.16-tonne generating system compares with more than 10 tonnes for a conventional turbine. The company rates the S2000 at up to 3 MW; that figure is a claim, not yet a measured output.

QUICK FACTS

DD-050-F01

On January 5, 2026, China's helium-lifted S2000 airborne turbine rose to 2,000 m and fed 385 kWh into the grid on its first flight.

DD-050-F02

Wind power rises with the cube of wind speed, which is why engineers are trying to fly turbines into stronger winds.

THE WRITE-UP

S1500 in the desert. In September 2025, SAWES flew a buoyant aerostat with 12 turbine-generators at 1,500 m in Hami, Xinjiang, in the first field deployment of a megawatt-scale buoyant high-altitude wind system.

S2000 on the grid. On January 5, 2026, in Yibin, Sichuan, the S2000 rose to 2,000 m in about 30 minutes, generated 385 kWh and fed it into the local grid. The developer calls it the first high-altitude wind device formally connected to a grid.

An airship that's a turbine. The S2000 is 60 m long, 40 m wide and 40 m high, with a volume of nearly 20,000 m³. Its 12 turbines sit in a duct between the helium envelope and a ring wing that funnels the wind.

Why go up. Wind power scales with the cube of wind speed, so stronger, steadier winds aloft give more energy and a better capacity factor. The S1500's generating system weighed 1.16 tonnes, against more than 10 tonnes for a conventional turbine.

Power down the tether. A helium aerostat lifts the lightweight generators, and electricity comes down a tethered cable. Target uses include off-grid sites such as border outposts and supplementing ground-based wind farms.

Claims vs. measurements. The S2000 is rated at up to 3 MW. The S1500's 1.135 MW steady-state output came from a PSCAD/EMTDC simulation, not a field measurement.

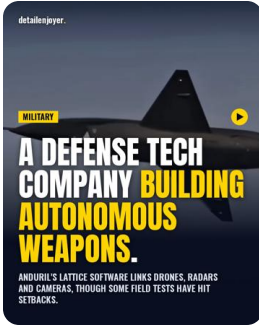
REEL VS. RECORD

- **Confirmed from the frames:** the Reel is about Chinese airborne wind turbines (captions at 0.8–2.4 s). The footage shows SAWES's helium aerostats (S1500/S2000), which carry ducted turbines and send power down a tether. [Global Times; IET 2026]
- **Unnamed:** the Reel never names the project. It's SAWES Energy Technology (Beijing Linyi Yunchuan); the S2000 flew at 2,000 m on January 5, 2026, about two weeks before this Reel was posted. [Global Times; Interesting Engineering]
- **Generic:** the Reel lists 'tethered drones, kites, or balloon-supported platforms', but the Chinese projects in the footage are buoyant helium aerostats, not kites or drones. [IET 2026; Global Times]
- **Hype check:** megawatt figures are ratings or simulations. The S2000 is rated at up to 3 MW, the S1500's 1.135 MW came from a computer simulation, and the measured result was 385 kWh on the S2000's maiden flight. [IET 2026; Global Times]
- **Supported:** winds aloft are 'stronger and more consistent'. Power rises with the cube of wind speed, and steadier winds improve the capacity factor. [IET 2026; Global Times]

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Permalink: <https://detailenjoyer.com/case/airborne-wind-turbines/> · Last updated Jan 21, 2026



ANDURIL

Anduril Industries was incorporated on April 20, 2017, by Palmer Luckey (creator of the Oculus Rift), Trae Stephens, Matt Grimm, Joe Chen and Brian Schimpf (now CEO). It's based in Costa Mesa, California. Its Lattice software fuses data from Anduril's own and third-party sensors and is the core of its products, which range from Sentry surveillance towers used on the U.S.–Mexico border to Ghost and Altius drones, Roadrunner and Barracuda interceptors and missiles, Ghost Shark autonomous submarines and the Fury (YFQ-44A) collaborative combat aircraft, first flown on October 31, 2025. Unlike traditional contractors paid to develop to a Pentagon requirement, it builds products on its own money and then sells them. A \$5 billion raise in May 2026 valued it at \$61 billion, and 2025 revenue was reported at about \$2.2 billion. It also has critics: the WSJ reported test setbacks, including a Navy exercise in which more than a dozen Lattice-controlled drone boats failed, and civil-liberties groups have criticized its border towers.

QUICK FACTS

DD-727-F01

Anduril was founded in 2017 by a group that included Oculus Rift creator Palmer Luckey, and it's named after Aragorn's sword in The Lord of the Rings.

DD-727-F02

Anduril's Lattice software fuses data from drones, radars and cameras into one picture, though a Navy test of Lattice-run drone boats left more than a dozen dead in the water.

THE WRITE-UP

Who founded it. Anduril was incorporated on April 20, 2017, by Palmer Luckey, Trae Stephens, Matt Grimm, Joe Chen and Brian Schimpf. The name comes from Aragorn's sword in The Lord of the Rings.

Lattice. Lattice uses AI to classify objects by fusing data from many sensors, Anduril's and third parties'. It's the core of the company's products and has run border and military-base surveillance.

Building before being asked. The company develops products before the Pentagon requests them, in contrast to the traditional model in which a contractor is paid to develop against a set requirement.

What it makes. Its products include Sentry towers, Ghost and Altius drones, Anvil and Roadrunner interceptors, Barracuda cruise missiles, the Ghost Shark submarine and the Fury (YFQ-44A) uncrewed combat aircraft, first flown on October 31, 2025.

Money. A \$5 billion round in May 2026 valued Anduril at \$61 billion, double its June 2025 valuation of \$30.5 billion. That figure is a private valuation, not a market price.

Setbacks and criticism. The WSJ reported breakdowns and safety issues, including a Navy exercise in which more than a dozen Lattice-run drone boats idled and had to be towed. The ACLU and others have criticized its border towers.

REEL VS. RECORD

- **Confirmed from the frames:** the Reel is about Anduril Industries (captions at 0.8–4.0 s), a U.S. defense tech company founded in 2017 whose Lattice software fuses data from drones, radars and cameras. [Wikipedia; Wired]
- **Garbled:** 'rather than traditional defense procurement models.' What sets Anduril apart is its business model: it develops products with its own money before the Pentagon asks, instead of being paid to build to a requirement. It still sells through government contracts. [Wired; Wikipedia]
- **Understated:** 'autonomous military systems' undersells it. Anduril also makes weapons, including Roadrunner-M interceptors, Barracuda cruise missiles, Altius loitering munitions and the Fury uncrewed combat jet. [Wikipedia]
- **Note:** One-sided: the Reel leaves out the setbacks. The WSJ reported breakdowns and safety issues, including a Navy drone-boat exercise in which more than a dozen Lattice-run boats failed, and civil-liberties groups have criticized its border towers. [WSJ; Wikipedia]
- **Source note:** the credit reads 'Source: Anduril', so the footage (launches, intercepts, the Lattice interface) is the company's own promotional material, not independent footage. [frames]

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Permalink: <https://detailenjoyer.com/case/anduril/> · Last updated Jul 10, 2026



SELF-MADE MODULAR

Self-reconfigurable modular robots are machines built from many units that can rearrange how they connect, to change shape for new tasks or to repair themselves. The idea of applying a common connector to a whole robot dates to Toshio Fukuda's CEBOT in the late 1980s. About 30 systems had been built by the time of the Wikipedia survey, but demonstrations have topped out around 50 units, and the promised robustness and low cost haven't been shown. The footage isn't one of those systems. It shows GITAI's Lunar Rover and three Inchworm robots with grapple ends building a 5-meter communications tower in a desert simulating the Moon. GITAI and KDDI announced the demo in December 2023 and March 2024. The robots then attached an antenna, connected power and took the tower apart again.

QUICK FACTS

DD-061-F01

Self-reconfigurable modular robots trace back to Toshio Fukuda's CEBOT ('cellular robot') in the late 1980s.

DD-061-F02

GITAI's Inchworm robots and Lunar Rover built and then took apart a 5-meter tower in a desert simulating the Moon.

THE WRITE-UP

What they are. Self-reconfigurable modular robots can change their own shape by rearranging how their modules connect, to adapt to new tasks or recover from damage. Modules can carry electronics, sensors, processors and power supplies.

Origins. Applying a common connection mechanism to a whole robot began with Toshio Fukuda's CEBOT (cellular robot) in the late 1980s. In the early 1990s Mark Yim, Gregory Chirikjian and Satoshi Murata built chain and lattice systems.

Still mostly prototypes. Only systems of up to about 50 units have been demonstrated. Lab prototypes have been fragile and expensive, and the promised robustness and low cost haven't been shown.

Self-assembly vs. reconfiguration. Self-assembling systems are built from modules but can't actively control their final shape, so formally they're a different family from self-reconfigurable robots.

What the footage shows. The clips show GITAI's Lunar Rover and three Inchworm robots, with grapple end-effectors on both ends of their arms. In a desert simulating the lunar surface, they built a 5-meter communications tower, attached an antenna, connected power, and then took the tower apart.

Lunar construction. Space is a leading proposed use. A 2026 paper shows dual robot arms autonomously assembling modular solar panels for a future lunar base.

REEL VS. RECORD

- **Footage correction:** the clips show GITAI's Inchworm robots and Lunar Rover building a 5-meter lunar communications tower in a desert test, not a swarm of self-assembling solar modules. [GITAI; KDDI]
- **Note:** Correction on 'each module harvests energy from sunlight': that isn't a defining or typical feature. Modules may carry power supplies or share power through their connectors, and GITAI doesn't describe its robots as solar-powered. [Wikipedia; GITAI]
- **Nuance:** 'self-assembling' and 'self-reconfiguring' differ. Self-assembling systems can't actively control their final shape, while self-reconfigurable robots rearrange their own connections. [Wikipedia]
- **Missing context:** the field is still largely at the prototype stage. Demonstrations top out around 50 units, and robustness and low cost haven't been shown. [Wikipedia]
- **Context:** the idea dates to CEBOT in the late 1980s. Space construction is a leading proposed use, as in GITAI's lunar tower demo and a 2026 study of robot arms assembling modular solar panels. [Wikipedia; GITAI; arXiv 2026]

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Permalink: <https://detailenjoyer.com/case/self-made-modular/> · Last updated Jul 9, 2025



DD-734 TECH · 11 OF 22

VOLAR EVTOL

Bellwether Industries, founded in London in 2019, is developing the Volar, a wingless lifting-body eVTOL with ducted fans hidden inside its body. In November 2021, a half-scale, remotely piloted two-seat prototype called Antelope made eight free flights in Dubai, up to about 4 m high and about 40 km/h. The company's targets for the final aircraft are 4 to 5 seats, a width of 3.2 m, about 220 km/h and a 600 kg maximum takeoff weight. In 2023 it announced a propulsion partnership with Schubeler for its next prototype, Oryx. None of these targets has been demonstrated at full scale.

QUICK FACTS

DD-734-F01

The Volar has flown only as a half-scale, remotely piloted prototype.

DD-734-F02

Its electric propulsion is ducted fans hidden in the body.

THE WRITE-UP

The company. Bellwether Industries was founded in London in 2019. It pitches the Volar as a private aircraft for trips within cities.

First free flights. In November 2021, a remotely piloted half-scale prototype made eight untethered flights in Dubai, reaching about 4 m (13 ft) at about 40 km/h. These followed a year of indoor tethered tests.

Hidden fans. The propulsion is ducted fans concealed inside the bodywork. New Atlas observed what appeared to be four fixed units and no separate cruise propulsion.

Targets, not results. For the full-size aircraft, the company targets 4 to 5 seats, a width of 3.2 m, cruising at up to 915 m (3,000 ft) and 220 km/h, and a 600 kg maximum takeoff weight. New Atlas questioned whether batteries could support those goals.

Next steps. In 2023, Bellwether announced a partnership with Schubeler on electric ducted-fan propulsion for its next-generation prototype, Oryx.

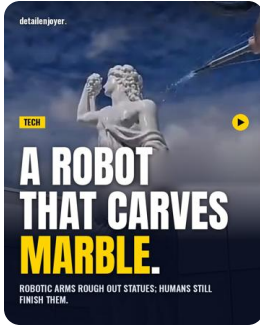
REEL VS. RECORD

- **Status:** the Volar has flown only as a half-scale, remotely piloted prototype (eight flights in Dubai in November 2021, at about 4 m and 40 km/h). No full-scale aircraft has flown.
- **Missing context:** performance figures (220 km/h, 4 to 5 seats, 600 kg takeoff weight) are company targets, and New Atlas questioned their feasibility with current batteries.
- **Precision:** the 'hidden electric propulsion' is ducted fans. The prototype appeared to have four fixed units and no separate cruise propulsion.
- **Missing context:** the final aircraft would be about 3.2 m wide, roughly 1.5 m wider than an average car, which works against the 'compact' claim.
- **Missing context:** Bellwether was founded in London in 2019 and announced a propulsion partnership with Schubeler in 2023 for its next prototype, Oryx.

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Permalink: <https://detailenjoyer.com/case/volar-evtol/> · Last updated Sep 1, 2026



DD-722 TECH / HISTORY · 12 OF 22

ROBOCLASSICAL

In and around Carrara, Italy, studios such as Robotor use large multi-axis industrial robots to carve marble from 3D scans or digital models. Software turns the model into toolpaths and the robot removes stone. Bloomberg described a 4.5-ton robot working along nine axes. Robotor's co-founder Giacomo Massari told 60 Minutes the robots are about 10 times faster than hand carving, and says they do about 99% of the work. Skilled artisans still hand-finish the surfaces and details the machine can't reach, which can take months. Some Carrara sculptors object that robot-made work isn't true sculpture.

QUICK FACTS

DD-722-F01

Robotor's co-founder says the robots carve about 10 times faster than hand tools.

DD-722-F02

Human artisans still hand-finish robot-carved statues.

THE WRITE-UP

From file to stone. A scan or digital model is converted into a 3D file, and software generates the toolpaths the robot follows to carve the block.

The machines. Bloomberg described a 4.5-ton steel robot carving a statue while working along nine axes, able to twist, tilt and spin its tool.

Speed. Robotor co-founder Giacomo Massari told 60 Minutes the robot is about 10 times faster than working with hammer and chisel.

Humans still finish. The robot does most of the carving, but skilled workers refine the surfaces and details it can't reach. Massari has put it at about 99% machine and 1% human, though that last stage can take months.

The debate. Some Carrara craftsmen object. Diego Zampolini of the Cooperativa Scultori di Carrara has called a robot-finished sculpture 'a dead sculpture'.

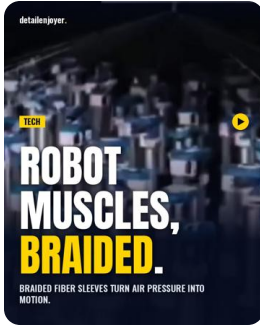
REEL VS. RECORD

- **Missing context:** robots rarely finish a statue alone. Skilled artisans hand-finish the details and surfaces, which can take months (60 Minutes; Euronews).
- **Attribution:** the speed claims ('10 times faster', '99% machine') come from Robotor's co-founder, Giacomo Massari.
- **Missing context:** robot carving is centered in Carrara, Italy, home of the famous marble, where studios like Robotor carve work for well-known artists.
- **Missing context:** the practice is debated, and some Carrara sculptors say robot-made work isn't true sculpture.
- **Precision:** the arms can be large, like the 4.5-ton, nine-axis robot Bloomberg described. The specific cutting tools vary by studio and weren't independently confirmed.

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Permalink: <https://detailenjoyer.com/case/roboclassical/> · Last updated Jun 5, 2026



DD-716 TECH / SCIENCE · 13 OF 22

ROBOWEAVING

Braiding has been central to soft robotics since the McKibben artificial muscle, an inflatable bladder inside a braided sleeve. When pressurized, the muscle shortens and thickens, and the braid angle sets how far. Researchers have since braided many thin McKibben muscles together into bundles for musculoskeletal robots, 3D-printed braided sleeves, and used braiding with water-soluble fibers to make actuators that twist. Varying the braid pattern along the length lets one structure combine extension, contraction and twist. The footage shows a braiding machine and a braided robotic hand, but the Reel doesn't name the lab or project.

QUICK FACTS

DD-716-F01

McKibben artificial muscles are inflatable bladders inside braided sleeves.

DD-716-F02

Braid angle determines whether a pneumatic actuator contracts or extends.

THE WRITE-UP

The braided muscle. A McKibben, or pneumatic artificial, muscle is a rubber bladder inside a braided mesh sleeve. When it's inflated, the braid's geometry turns the pressure into contraction along its length, much like a real muscle.

Angle is everything. The angle of the braid fibers determines whether, and how much, the actuator contracts or extends as pressure rises.

Thin muscles, braided. Researchers have braided many thin McKibben muscles together to multiply their contraction and force for musculoskeletal robots.

New ways to make them. Teams have 3D-printed braided sleeves directly, and used braiding with water-soluble fibers to make artificial muscles that twist.

What the Reel shows. The footage shows a braiding machine and a braided, finger-like structure, an application of the braided-actuator principle. The Reel doesn't name the lab or project.

REEL VS. RECORD

- **Terminology:** the field is usually called 'soft robotics'. 'Soft tissue robotics' isn't a standard term.
- **Missing context:** braiding in soft robotics goes back to the McKibben artificial muscle, a bladder inside a braided sleeve, used in early prosthetics research.
- **Mechanism:** the braid angle is what sets the motion. Under pressure, a sleeve shortens or lengthens depending on its fiber angle.
- **Missing context:** recent work includes braided bundles of thin McKibben muscles, 3D-printed braided sleeves and twisting muscles made with water-soluble fibers.
- **Source:** the Reel doesn't identify the lab or project shown, and the credit is a reposting account.

SOURCES

1. Wikipedia: Pneumatic artificial muscles: https://en.wikipedia.org/wiki/Pneumatic_artificial_muscles
2. Kurumaya et al. (2018), Braiding thin McKibben muscles to enhance their contracting abilities, IEEE Robotics and Automation Letters: <https://doi.org/10.1109/lra.2018.2851025>
3. Three-dimensional printed braided sleeves for manufacturing McKibben artificial muscles (2019), 3D Printing and Additive Manufacturing: <https://doi.org/10.1089/3dp.2018.0103>
4. Fabrication process for twisting artificial muscles by utilizing braiding technology and water-soluble fibers (2024), IEEE RA-L: <https://doi.org/10.1109/lra.2024.3360817>

Permalink: <https://detailenjoyer.com/case/roboweaving/> · Last updated May 2, 2026



DRONE DE-ICING

Ice on power lines adds weight and can snap conductors or topple towers, as China's grid saw in the severe winter storms of early 2008. In January and February 2026, State Grid units in several Chinese provinces publicized drone-based de-icing during cold waves. In Shanxi, drones carrying insulating rods knocked ice off ultra-high-voltage lines (Xinhua). In Zhejiang, a DJI FC30 heavy-lift drone placed a robot on an overhead ground wire, where it broke ice by impact, knocking and rolling (China Daily). In Hubei, a 'flying de-icing robot' used vibration plus rotating blades on a ± 800 kV line (ChinaNews). In Anhui, a drone-placed robot cleared about 20 m of iced wire in about a minute (CGTN). Utilities say the methods reduce the need for crews to climb towers or knock ice off by hand.

QUICK FACTS

DD-699-F01

A drone-placed robot first de-iced a ground wire in Shaoxing on January 20, 2026.

DD-699-F02

Hubei's flying robot combined vibration with rotating blades.

THE WRITE-UP

Why ice matters. Freezing rain coats conductors in ice, adding weight and wind load that can snap lines or topple towers. Southern China's grid was badly damaged in the winter storms of early 2008.

Rods on drones. In Shanxi, crews flew drones carrying insulating rods to knock ice off ultra-high-voltage lines, according to Xinhua.

Robots placed by drone. In Zhejiang, a DJI FC30 heavy-lift drone hung a robot on an overhead ground wire, where it moved along and broke the ice by impact, knocking and rolling. China Daily says it was the robot's first use, on January 20, 2026.

Vibration and blades. On the ± 800 kV Shaanbei-Wuhan line in Hubei, a 'flying de-icing robot' combined high-frequency vibration with rotating blades. ChinaNews reported it was about 60% faster than manually installing vibration de-icers.

Speed claims. CGTN reported that in Anhui a drone-placed robot cleared about 20 m of iced wire in about one minute. These are utility and state-media figures, not independent tests.

REEL VS. RECORD

- **Precision:** in many systems the drone doesn't do the de-icing itself. It places a robot on the line that breaks the ice by rolling, knocking or vibration (China Daily, CGTN).
- **Missing location:** the publicized examples are from China's State Grid, in Shanxi, Zhejiang, Hubei and Anhui, during cold waves in January and February 2026.
- **Unverified:** I couldn't confirm 'directed airflow systems' in the deployments I found, which used insulating rods, impact and rolling robots, and vibration with blades.
- **Attribution:** speed figures, such as 20 m in about a minute and 60% faster than manual installation, come from utilities and state media, not independent tests.
- **Missing context:** some de-icing is done on ground wires (the shield wires above the conductors), not only on the current-carrying lines.

SOURCES

1. Xinhua (Jan 25, 2026): Chinese drones remove ice buildup on power lines: <https://english.news.cn/20260125/858c78ab4db84b67b2555e6714fee02f/c.html>
2. China Daily (Jan 26, 2026): Shaoxing, Zhejiang, onboard de-icing robot makes operational debut: https://www.chinadaily.com.cn/m/china/2026-01/26/c_1157089.htm
3. ChinaNews via CRI (Jan 27, 2026): Flying de-icing robot 'eats ice' at 100 meters: <https://news.cri.cn/20260127/e3aa7501-0ae9-4843-a1f3-6a51ef0a8bee.html>
4. CGTN (Feb 23, 2026): Drone, robot take powerline de-icing efficiency to new level in China: <https://news.cgtn.com/news/2026-02-23/Drone-robot-take-powerline-de-icing-efficiency-to-new-level-in-China-1L0fLaPtsDm/p.html>
5. Wikipedia: 2008 Chinese winter storms: https://en.wikipedia.org/wiki/2008_Chinese_winter_storms

Permalink: <https://detailenjoyer.com/case/drone-de-icing/> · Last updated Feb 18, 2026



OCTOPUS ROBO-GRIP

In February 2020, researchers from Beihang University, Harvard's Wyss Institute and Harvard SEAS, and the automation company Festo published a study in *Soft Robotics* on octopus arm-inspired tapered soft actuators with suckers. Zhixin Xie and August Domel were co-first authors, and Katia Bertoldi and Li Wen were co-senior authors. The team measured how much octopus arms taper and found that a cone-shaped silicone actuator bends into a wider range of curvatures than a cylindrical one. A steeper taper curls less tightly but pushes with more force. The researchers added suction cups modeled on those of the common octopus (*Octopus vulgaris*), shrinking from base to tip, and all linked to a single vacuum line. The arm runs on two valves: one pressurizes it to bend, and one applies vacuum to the suckers. Harvard's press release says it gripped thin plastic sheets, mugs, test tubes, eggs, smartphones, exercise balls and even live crabs, and could reach into narrow openings. Xie is also co-inventor of the Festo Tentacle Gripper, a commercial prototype of the idea. In 2023, a Beihang-led team with Li Wen and Cecilia Laschi reported a sensorized soft octopus arm (E-SOAM) in *Science Robotics* that bends and elongates to reach and grasp. The footage shows a robot arm whose multi-tentacle gripper curls around a ball, a box, a hat and a plant, a demonstration of the same tapered, suction-cup design.

QUICK FACTS

DD-601-F01

A tapered soft arm bends more flexibly than a cylindrical one.

DD-601-F02

The 2020 octopus gripper runs on just two valves.

THE WRITE-UP

Taper matters. Cone-shaped actuators bend into a wider range of curvatures than cylindrical ones.

Two valves. One valve pressurizes the arm to bend; the other applies vacuum to the suckers.

Modeled suckers. The suction cups mimic those of the common octopus and shrink toward the tip.

Wide range of objects. It gripped eggs, mugs, test tubes, phones, exercise balls and live crabs.

Next step. A 2023 Beihang-led octopus arm (E-SOAM) bends and elongates and carries sensors.

REEL VS. RECORD

- **Note:** 'Uses a muscular hydrostat structure': octopus arms are muscular hydrostats, but the 2020 robot arm is a pneumatic silicone actuator. It mimics the arm's taper and suckers, not its muscle structure.
- **Note:** 'Bend, elongate, and grip': the 2020 gripper bends and grips. Elongation came in a later Beihang-led arm, E-SOAM (Science Robotics, 2023).
- **Note:** 'Developed by Harvard and Beihang University researchers': yes, together with Festo, whose engineer Elias Knubben co-authored the 2020 study.
- **Note:** 'Vacuum-powered suction cups': yes. All the suckers share one vacuum line, controlled by its own valve.
- **Missing:** a steeper taper curls less tightly but pushes with more force, so designers can tune the taper angle for a task.

SOURCES

1. Wyss Institute (Feb 27, 2020): The Tentacle Bot: <https://wyss.harvard.edu/news/the-tentacle-bot/>
2. Harvard SEAS: The Tentacle Bot: <https://seas.harvard.edu/news/tentacle-bot>
3. Xie, Domel et al. (2020): Octopus arm-inspired tapered soft actuators with suckers for improved grasping, Soft Robotics: <https://doi.org/10.1089/soro.2019.0082>
4. Xie et al. (2023): Octopus-inspired sensorized soft arm for environmental interaction, Science Robotics: <https://www.science.org/doi/10.1126/scirobotics.adh7852>

Permalink: <https://detailenjoyer.com/case/octopus-robo-grip/> · Last updated Jun 20, 2025



DD-614 TECH · 16 OF 22

NVIDIA'S BLUE

Blue is a small, Star Wars-inspired robot from Disney Research, part of the company's BDX droid family. It joined NVIDIA CEO Jensen Huang onstage during his GTC 2025 keynote in San Jose on March 18, 2025. TechRadar quotes Huang as saying, "Blue has two Nvidia computers inside." Disney Research's Moritz Bächer told TechRadar that each BDX droid has four actuators in the head and neck, five in each leg, and two NVIDIA Jetson computers. The droids learn to move in character through reinforcement learning in simulation. At the same keynote, NVIDIA announced Newton, an open-source physics engine for robotics built on its Warp GPU framework and OpenUSD. NVIDIA's announcement describes Newton as co-developed with Google DeepMind and Disney Research, and says Disney Research would be the first to use it for its robotic characters. Newton was not yet available at GTC. On September 29, 2025, the three organizations contributed it to the Linux Foundation, and it was released in beta under open governance. Disney had already shown BDX droids at GTC 2024. The Reel's footage shows the droid walking on a dark stage in front of a desert backdrop.

QUICK FACTS

DD-614-F01

Disney Research's Blue appeared at NVIDIA's GTC 2025 keynote.

DD-614-F02

Newton physics engine was released in beta under the Linux Foundation in September 2025.

THE WRITE-UP

Onstage. Disney Research's Blue joined Jensen Huang at the GTC 2025 keynote on March 18, 2025.

Inside the droid. BDX droids have two NVIDIA Jetson computers and 14 actuators.

Trained virtually. The droids learn their in-character moves through reinforcement learning in simulation.

Newton. Newton is an open-source physics engine built on NVIDIA Warp, co-developed with Google DeepMind and Disney Research.

Open release. Newton was announced at GTC 2025 and released in beta under the Linux Foundation on September 29, 2025.

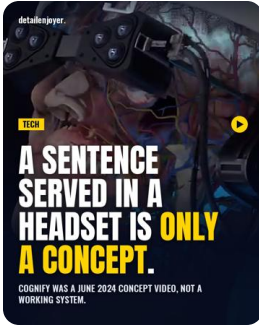
REEL VS. RECORD

- **Note:** 'Nvidia working with Disney Research and Google DeepMind, unveiled Blue': Blue is a Disney Research robot. The three-way collaboration is Newton, the physics engine, which NVIDIA announced at the same keynote.
- **Note:** 'It uses Newton': at GTC 2025, NVIDIA said Disney Research would be the first to use Newton. The engine wasn't released until a beta in September 2025, so the claim is attributed to the announcement.
- **Note:** 'Nvidia's new open-source physics engine': Newton is co-developed by NVIDIA, Google DeepMind and Disney Research, and since September 29, 2025 it has been governed by the Linux Foundation.
- **Note:** 'Driven by two onboard Nvidia computers': yes, two NVIDIA Jetson computers, according to Disney Research and to Huang onstage. The droids also have four actuators in the head and neck and five in each leg.
- **Missing:** Blue belongs to Disney's BDX droid family, which had already appeared at GTC 2024. 'Unveiled' applies to Blue as a character, not to the BDX platform.

SOURCES

1. NVIDIA Technical Blog: Announcing Newton, an Open-Source Physics Engine for Robotics Simulation (March 18, 2025): <https://developer.nvidia.com/blog/announcing-newton-an-open-source-physics-engine-for-robotics-simulation/>
2. TechRadar: Nvidia, Google, and Disney's AI-powered Star Wars robot (March 19, 2025): <https://www.techradar.com/computing/artificial-intelligence/nvidia-google-and-disneys-ai-powered-star-wars-robot-is-absolutely-the-droid-ive-been-looking-for>
3. TechRadar: Disney's associate lab director of Robotics on the Star Wars BDX Droids: <https://www.techradar.com/streaming/entertainment/star-wars-bdx-droids-the-inside-story-on-what-lies-ahead>
4. Linux Foundation: Contribution of Newton by Disney Research, Google DeepMind and NVIDIA (September 29, 2025): <https://www.linuxfoundation.org/press/linux-foundation-announces-contribution-of-newton-by-disney-research-google-deepmind-and-nvidia-to-accelerate-open-robot-learning>

Permalink: <https://detailenjoyer.com/case/nvidias-blue/> · Last updated Jul 13, 2025



A PRISON FOR YOUR MIND

As of 2024, virtual prisons are a speculative idea, not a system any prison uses. The footage comes from 'Cognify', a concept video that Berlin-based filmmaker and science communicator Hashem Al-Ghaili posted on June 24, 2024. His concept goes further than the Reel's VR headsets: it imagines AI-generated artificial memories implanted into a prisoner's brain so that years of rehabilitation could be experienced in minutes, including seeing a crime from the victim's perspective. Al-Ghaili told Dazed he was motivated by problems such as overcrowding, false imprisonment and ineffective rehabilitation. Snopes reported in 2025 that no such technology exists; implanting false memories has only been shown in a basic form in mice. Commentators also raised ethical concerns about consent and the collection of prisoners' brain data. The footage shows a person in a headset strapped to a chair, with computer-generated scenes.

QUICK FACTS

DD-305-F01

Cognify is a 2024 concept video, not a real prison system.

DD-305-F02

Snopes found no such technology exists.

THE WRITE-UP

Only a concept. Cognify is a speculative concept, not a working system.

June 2024 video. Hashem Al-Ghaili posted the Cognify concept video on June 24, 2024.

Artificial memories. The concept imagines implanting AI-generated memories to speed up rehabilitation.

Stated motivation. Al-Ghaili cited overcrowding, false imprisonment and ineffective rehabilitation.

No such technology. Snopes reported in 2025 that no such technology exists.

REEL VS. RECORD

- **Note:** 'Virtual prisons are a conceptual form of incarceration': right, and I'd stress the word conceptual. No prison uses this.
- **Note:** Reel vs. record: the footage is from Cognify, which proposes implanted artificial memories rather than VR headsets with monitored movement, so I described both.

SOURCES

1. YouTube: The Prison of the Future - Cognify (Hashem Al-Ghaili): https://www.youtube.com/watch?v=YFUv4_ICBLY

2. Dazed: Inside Cognify, the 'prison of the future' where AI rewires your brain: <https://www.dazeddigital.com/life-culture/article/62983/1/inside-the-prison-of-the-future-where-ai-rewires-your-brain-hashem-al-ghaili>
3. Snopes: Does new 'Cognify' tech allow prisoners to complete years of social rehabilitation in minutes? (July 1, 2025): <https://www.snopes.com/news/2025/07/01/new-tech-implant-prisoners-memories/>
4. Engadget: The AI prison of the future is just an Outer Limits episode: <https://www.engadget.com/the-ai-prison-of-the-future-is-just-an-outer-limits-episode-200937257.html>

Permalink: <https://detailenjoyer.com/case/a-prison-for-your-mind/> · Last updated Aug 20, 2024



ECTOGENESIS

Ectogenesis means growing an embryo or fetus outside the body. Research focuses on artificial wombs for extremely premature babies: in 2017 a Philadelphia team kept premature lambs alive for weeks in a fluid-filled 'biobag' that supplied oxygen and nutrients. No artificial womb has been used for human babies as of the Reel's posting. The footage, with rows of pods, comes from EctoLife, a 2022 concept video by Hashem Al-Ghaili; it is not a real facility.

QUICK FACTS

DD-324-F01

Ectogenesis is growth outside the body.

DD-324-F02

Research targets premature babies.

THE WRITE-UP

Definition. Ectogenesis is growth outside the body.

Premature babies. Research targets premature babies.

Biobag. Lambs were kept in a biobag in 2017.

Not yet human. It has not been used for human babies.

Concept. The footage is the EctoLife concept.

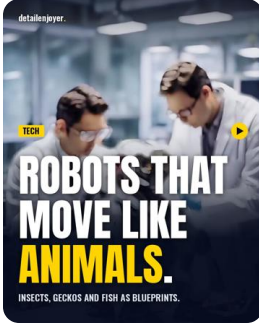
REEL VS. RECORD

- **Note:** The footage shows EctoLife, a concept animation from 2022, not a working facility.
- **Note:** Artificial wombs had not been used for human babies as of the Reel's posting.

SOURCES

1. Wikipedia: Artificial womb: https://en.wikipedia.org/wiki/Artificial_womb
2. Wikipedia: Ectogenesis: <https://en.wikipedia.org/wiki/Ectogenesis>

Permalink: <https://detailenjoyer.com/case/ectogenesis/> · Last updated Sep 16, 2024



DD-082 TECH / NATURE · 19 OF 22

BIOINSPIRED ROBOTS

Bioinspired robotics designs machines that copy how animals move and sense. Engineers have built flapping-wing drones modeled on insects and birds, robots that climb like geckos, and robotic fish that swim with flexible bodies. Copying these designs can make robots more agile and better suited to particular environments.

QUICK FACTS

DD-082-F01

Robots copy animal movement.

DD-082-F02

Some fly like insects and birds.

THE WRITE-UP

Idea. Robots copy animal movement.

Flight. Some fly like insects and birds.

Climbing. Some climb like geckos.

Swimming. Robotic fish swim.

Goal. The aim is agility and adaptability.

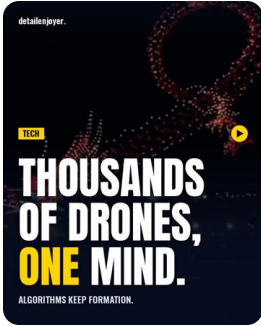
REEL VS. RECORD

- **Note:** None needed.

SOURCES

1. Wikipedia: Bio-inspired robotics: https://en.wikipedia.org/wiki/Bio-inspired_robotics

Permalink: <https://detailenjoyer.com/case/bioinspired-robots/> · Last updated Nov 16, 2023



DD-437 TECH · 20 OF 22

DRONE SWARMS

A drone swarm is a group of drones that coordinate through algorithms and wireless links, sharing data in real time to keep formation, divide tasks or adapt to changes. Swarms are used for light shows, mapping and search and rescue, and are also developed for military use. The footage shows a dense swarm of drones flying in formation.

QUICK FACTS

DD-437-F01

Drones coordinate.

DD-437-F02

Software controls them.

THE WRITE-UP

Group. Drones coordinate.

Algorithms. Software controls them.

Real time. They share data.

Uses. Shows, mapping, rescue.

Military. Also developed for defense.

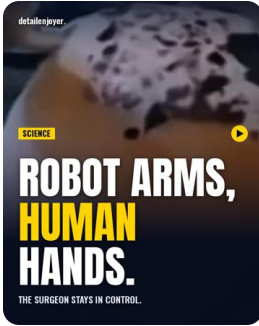
REEL VS. RECORD

- **Note:** None needed.

SOURCES

1. Wikipedia: Swarm robotics: https://en.wikipedia.org/wiki/Swarm_robotics
2. Wikipedia: Unmanned aerial vehicle: https://en.wikipedia.org/wiki/Unmanned_aerial_vehicle

Permalink: <https://detailenjoyer.com/case/drone-swarms/> · Last updated Dec 22, 2024



DD-408 SCIENCE / TECH · 21 OF 22

AI SURGERY

Robot-assisted surgery systems such as the da Vinci Surgical System let a surgeon at a console control robotic arms that hold instruments and a 3D camera, scaling down hand movements for fine work through small incisions. Software and AI are being added for imaging, guidance and analysis, but in clinical use the surgeon directs the procedure. The footage shows robotic arms performing delicate tasks.

QUICK FACTS

DD-408-F01

Surgeon controls from a console.

DD-408-F02

Robotic arms hold tools.

THE WRITE-UP

Console. Surgeon controls from a console.

Arms. Robotic arms hold tools.

Scaling. Movements are scaled.

Incisions. Small incisions.

AI. AI supports imaging.

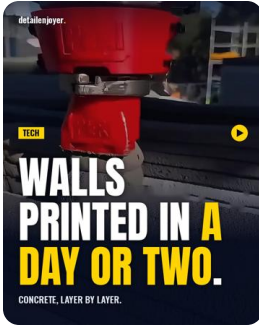
REEL VS. RECORD

- **Note:** The Reel says AI assists with suturing; in current clinical systems such as da Vinci, the surgeon performs and controls each step.

SOURCES

1. Wikipedia: Robot-assisted surgery: https://en.wikipedia.org/wiki/Robot-assisted_surgery
2. Wikipedia: Da Vinci Surgical System: https://en.wikipedia.org/wiki/Da_Vinci_Surgical_System

Permalink: <https://detailenjoyer.com/case/ai-surgery/> · Last updated Dec 4, 2024



DD-440 TECH · 22 OF 22

PRINT YOUR HOME

Construction 3D printing uses large gantry or robotic-arm printers to extrude concrete or similar mixes layer by layer, building walls directly from a digital design. Printing the walls of a small house can take roughly 24 to 48 hours of print time, though roofs, windows, plumbing and finishing add more time. Supporters cite less labor and waste. The footage shows a printer laying concrete walls.

QUICK FACTS

DD-440-F01

Layer by layer.

DD-440-F02

Concrete mixes.

THE WRITE-UP

Method. Layer by layer.

Material. Concrete mixes.

Speed. Walls in a day or two.

Finishing. Other work adds time.

Benefits. Less labor and waste.

REEL VS. RECORD

- **Note:** The Reel says entire homes can be printed in 24 to 48 hours; that is roughly the print time for the walls, and the rest of the build takes longer.

SOURCES

1. Wikipedia: Construction 3D printing: https://en.wikipedia.org/wiki/Construction_3D_printing

Permalink: <https://detailenjoyer.com/case/print-your-home/> · Last updated Dec 26, 2024

COLLECTION QUIZ

Test Your Knowledge: 44 questions from Machines of Tomorrow. Answers are on the next page.

1. How many teams competed at the 2026 World Humanoid Robot Games? (DD-023 · WHRGs 2026)

- A. 280
- B. 51
- C. 666
- D. 1,300

2. Where in Beijing were the 2026 Games held? (DD-023 · WHRGs 2026)

- A. The Bird's Nest (National Stadium)
- B. The National Speed Skating Oval ('Ice Ribbon')
- C. The Water Cube
- D. Workers' Stadium

3. How many ducted fans does Lunavity use? (DD-007 · Gravity, or Lunavity?)

- A. 4
- B. 8
- C. 16
- D. 32

4. Who built Lunavity? (DD-007 · Gravity, or Lunavity?)

- A. Students from Jun Rekimoto's lab at the University of Tokyo
- B. MIT Media Lab
- C. NASA's Jet Propulsion Laboratory
- D. A Formula 1 team

5. What does RLP stand for? (DD-013 · Rapid Liquid Printing (RLP))

- A. Robotic Laser Printing
- B. Rapid Liquid Printing
- C. Resin Layer Processing
- D. Remote Lithography Printing

6. Where does an RLP machine 'draw' its objects? (DD-013 · Rapid Liquid Printing (RLP))

- A. On a heated bed in open air
- B. Inside a tank of gel
- C. Underwater in a pool
- D. Inside a vacuum chamber

7. Roughly how tall is a Panthalassa Ocean-3 node? (DD-022 · Ocean-3)

- A. About 8.5 m
- B. About 25 m
- C. About 85 m
- D. About 850 m

8. How does Ocean-3 make its electricity? (DD-022 · Ocean-3)

- A. Solar panels on the sphere
- B. Seawater forced up its tube by the waves spins turbines
- C. A small diesel generator
- D. A power cable from shore

9. In which Texas county is Terafab planned? (DD-016 · TeraFab)

- A. Grimes County
- B. Travis County
- C. Harris County
- D. Bastrop County

10. How big is the first-phase investment announced for Terafab? (DD-016 · TeraFab)

- A. About \$1.68 billion
- B. More than \$16.8 billion
- C. About \$168 billion
- D. \$119 billion

11. What does ALPR stand for? (DD-030 · The Flock)

- A. Automatic Lane Position Radar
- B. Automated License Plate Reader
- C. Active Light Pulse Recorder
- D. Advanced Law-enforcement Patrol Robot

12. How do Flock cameras read plates at night? (DD-030 · The Flock)

- A. Floodlights
- B. Infrared imaging
- C. Radar
- D. They don't work at night

13. What pushes a solar sail? (DD-039 · Solar Sailing)

- A. The solar wind
- B. The momentum of sunlight
- C. Magnetic fields
- D. A small rocket

14. Why does a reflective sail get a bigger push than a black one? (DD-039 · Solar Sailing)

- A. It's lighter
- B. Photons push again when they bounce off
- C. It's hotter
- D. It's magnetic

15. What lifts China's S2000 airborne wind turbine? (DD-050 · Airborne Wind Turbines)

- A. Rotors like a helicopter
- B. A helium-filled aerostat
- C. A kite
- D. A rocket

16. How high did the S2000 fly on its January 2026 test? (DD-050 · Airborne Wind Turbines)

- A. 200 m
- B. 2,000 m
- C. 20,000 m
- D. 50 m

17. When was Anduril founded? (DD-727 · Anduril)

- A. 1999
- B. 2010
- C. 2017
- D. 2023

18. What does Lattice do? (DD-727 · Anduril)

- A. Builds jets
- B. Fuses sensor data into one picture
- C. Makes VR headsets
- D. Prints circuit boards

19. What can a self-reconfigurable modular robot do? (DD-061 · Self-Made Modular)

- A. Copy itself
- B. Rearrange its modules to change shape
- C. Fly unaided
- D. Run without power

20. What was CEBOT? (DD-061 · Self-Made Modular)

- A. A lunar rover
- B. An early 'cellular robot'
- C. A solar cell
- D. A chess program

21. Where did the Volar prototype first fly freely? (DD-734 · Volar eVTOL)

- A. London
- B. Dubai
- C. Tokyo
- D. Paris

22. How big was the flying prototype? (DD-734 · Volar eVTOL)

- A. Half-scale
- B. Full-scale
- C. Tenth-scale
- D. Double-scale

23. Which Italian town is the center of robot marble carving? (DD-722 · RoboClassical)

- A. Carrara
- B. Venice
- C. Naples
- D. Turin

24. How much faster than hand carving does Robotor say its robot is? (DD-722 · RoboClassical)

- A. About 2x
- B. About 10x
- C. About 100x
- D. About 1,000x

25. What's a McKibben muscle made of? (DD-716 · RoboWeaving)

- A. A bladder in a braided sleeve
- B. Steel springs
- C. Electric motors
- D. Hydraulic pistons

26. What happens to a McKibben muscle when it's inflated? (DD-716 · RoboWeaving)

- A. It shortens
- B. It melts
- C. It glows
- D. Nothing

27. In the Zhejiang system, what does the drone do? (DD-699 · Drone De-icing)

- A. Places a de-icing robot on the wire
- B. Melts ice with a flame
- C. Sprays salt
- D. Cuts the wire

28. Which company's grid units publicized these deployments? (DD-699 · Drone De-icing)

- A. State Grid (China)
- B. Tokyo Electric
- C. National Grid UK
- D. Hydro-Québec

29. Which university partnered with Harvard on the 2020 octopus gripper? (DD-601 · Octopus Robo-Grip)

- A. Beihang University
- B. Oxford University
- C. MIT
- D. Tokyo University

30. What shape gave the arm more flexibility? (DD-601 · Octopus Robo-Grip)

- A. A tapered cone
- B. A perfect cylinder
- C. A cube
- D. A flat sheet

31. At which event did Blue appear onstage with Jensen Huang? (DD-614 · NVIDIA's Blue)

- A. GTC 2025
- B. CES 2020
- C. WWDC 2023
- D. E3 2019

32. Which organization built Blue? (DD-614 · NVIDIA's Blue)

- A. Disney Research
- B. Boston Dynamics
- C. Tesla
- D. Sony

33. Is Cognify a working prison system? (DD-305 · A Prison for Your Mind)

- A. No, it's a concept
- B. Yes, in Germany
- C. Yes, in the US
- D. Yes, in trials

34. When was the Cognify video posted? (DD-305 · A Prison for Your Mind)

- A. June 24, 2024
- B. January 1, 2020
- C. March 3, 2015
- D. October 10, 2026

35. What does ectogenesis mean? (DD-324 · Ectogenesis)

- A. Growth outside the body
- B. Cloning
- C. Gene editing
- D. Hibernation

36. Who might benefit first? (DD-324 · Ectogenesis)

- A. Extremely premature babies
- B. Adults
- C. Pets
- D. Plants

37. What do bioinspired robots copy? (DD-082 · BioInspired Robots)

- A. Animals
- B. Rocks
- C. Clouds
- D. Buildings

38. Which animal inspires climbing robots? (DD-082 · BioInspired Robots)

- A. Geckos
- B. Cows
- C. Sharks
- D. Owls

39. What coordinates a swarm? (DD-437 · Drone Swarms)

- A. Algorithms
- B. A single pilot each
- C. Wind
- D. Magnets

40. A civilian use? (DD-437 · Drone Swarms)

- A. Light shows
- B. Mining coal
- C. Cooking
- D. Plowing

41. Who controls da Vinci? (DD-408 · AI Surgery)

- A. The surgeon
- B. The robot alone
- C. A nurse remotely
- D. No one

42. What size incisions? (DD-408 · AI Surgery)

- A. Small
- B. Large
- C. None
- D. Huge

43. What is extruded? (DD-440 · Print Your Home)

- A. Concrete
- B. Plastic only
- C. Wood
- D. Glass

44. How are walls built? (DD-440 · Print Your Home)

- A. Layer by layer
- B. Brick by brick
- C. Poured at once
- D. Sewn

ANSWER KEY

1. **C. 666** Now You Know: 666 teams took part (280 was the 2025 total; 51 was the number of events). (DD-023)
2. **B. The National Speed Skating Oval ('Ice Ribbon')** Now You Know: The Games ran Aug 22–26, 2026 at the National Speed Skating Oval, the 'Ice Ribbon'. (DD-023)
3. **C. 16** Now You Know: A ring of 16 electric ducted fans above the wearer pushes air down for lift. (DD-007)
4. **A. Students from Jun Rekimoto's lab at the University of Tokyo** Now You Know: Lunavity was built by students from Jun Rekimoto's lab at the University of Tokyo. (DD-007)
5. **B. Rapid Liquid Printing** Now You Know: Rapid Liquid Printing, developed at MIT's Self-Assembly Lab. (DD-013)
6. **B. Inside a tank of gel** Now You Know: The nozzle prints inside a granular gel that holds the liquid in place while it cures. (DD-013)
7. **C. About 85 m** Now You Know: Each node is about 85 m of plate steel, close to the height of Big Ben. (DD-022)
8. **B. Seawater forced up its tube by the waves spins turbines** Now You Know: As waves lift and drop the node, seawater is driven up the tube into the sphere, where it spins turbines. (DD-022)
9. **A. Grimes County** Now You Know: Terafab is planned for Grimes County, about 20 miles east of College Station. (DD-016)
10. **B. More than \$16.8 billion** Now You Know: The first phase is a capital investment of more than \$16.8 billion; \$119B is the potential four-phase total. (DD-016)
11. **B. Automated License Plate Reader** Now You Know: ALPR is an automated license plate reader. Flock Safety is the largest U.S. maker. (DD-030)
12. **B. Infrared imaging** Now You Know: Infrared illumination and capture keep plates readable in the dark. (DD-030)
13. **B. The momentum of sunlight** Now You Know: Photons carry momentum. The solar wind's push is less than one percent as strong. (DD-039)
14. **B. Photons push again when they bounce off** Now You Know: Light pushes once on arrival and again on reflection. (DD-039)
15. **B. A helium-filled aerostat** Now You Know: It's a buoyant, ducted airship tethered to the ground. (DD-050)
16. **B. 2,000 m** Now You Know: It took about 30 minutes to reach 2,000 m. (DD-050)
17. **C. 2017** Now You Know: It was incorporated on April 20, 2017. (DD-727)
18. **B. Fuses sensor data into one picture** Now You Know: It's the software at the core of Anduril's products. (DD-727)
19. **B. Rearrange its modules to change shape** Now You Know: It changes shape to adapt to new tasks or recover from damage. (DD-061)
20. **B. An early 'cellular robot'** Now You Know: Toshio Fukuda introduced it in the late 1980s. (DD-061)
21. **B. Dubai** Now You Know: In Dubai in November 2021. (DD-734)
22. **A. Half-scale** Now You Know: It was a half-scale, remotely piloted model. (DD-734)

- 23. **A. Carrara** Now You Know: Carrara, home of the famous marble. *(DD-722)*
- 24. **B. About 10x** Now You Know: About 10 times faster, per Giacomo Massari. *(DD-722)*
- 25. **A. A bladder in a braided sleeve** Now You Know: An inflatable bladder inside a braided sleeve. *(DD-716)*
- 26. **A. It shortens** Now You Know: It contracts along its length. *(DD-716)*
- 27. **A. Places a de-icing robot on the wire** Now You Know: It hangs a robot on the ground wire. *(DD-699)*
- 28. **A. State Grid (China)** Now You Know: State Grid units in China. *(DD-699)*
- 29. **A. Beihang University** Now You Know: With Festo as well. *(DD-601)*
- 30. **A. A tapered cone** Now You Know: Tapered actuators bend into more curvatures. *(DD-601)*
- 31. **A. GTC 2025** Now You Know: On March 18, 2025. *(DD-614)*
- 32. **A. Disney Research** Now You Know: Part of its BDX droid family. *(DD-614)*
- 33. **A. No, it's a concept** Now You Know: It's a speculative video concept. *(DD-305)*
- 34. **A. June 24, 2024** Now You Know: Hashem Al-Ghaili posted it. *(DD-305)*
- 35. **A. Growth outside the body** Now You Know: Ecto = outside. *(DD-324)*
- 36. **A. Extremely premature babies** Now You Know: Neonatal care. *(DD-324)*
- 37. **A. Animals** Now You Know: Movement and sensing. *(DD-082)*
- 38. **A. Geckos** Now You Know: Sticky feet. *(DD-082)*
- 39. **A. Algorithms** Now You Know: Software. *(DD-437)*
- 40. **A. Light shows** Now You Know: Displays. *(DD-437)*
- 41. **A. The surgeon** Now You Know: Console. *(DD-408)*
- 42. **A. Small** Now You Know: Minimally invasive. *(DD-408)*
- 43. **A. Concrete** Now You Know: Layers. *(DD-440)*
- 44. **A. Layer by layer** Now You Know: Additive. *(DD-440)*

NOW YOU KNOW!