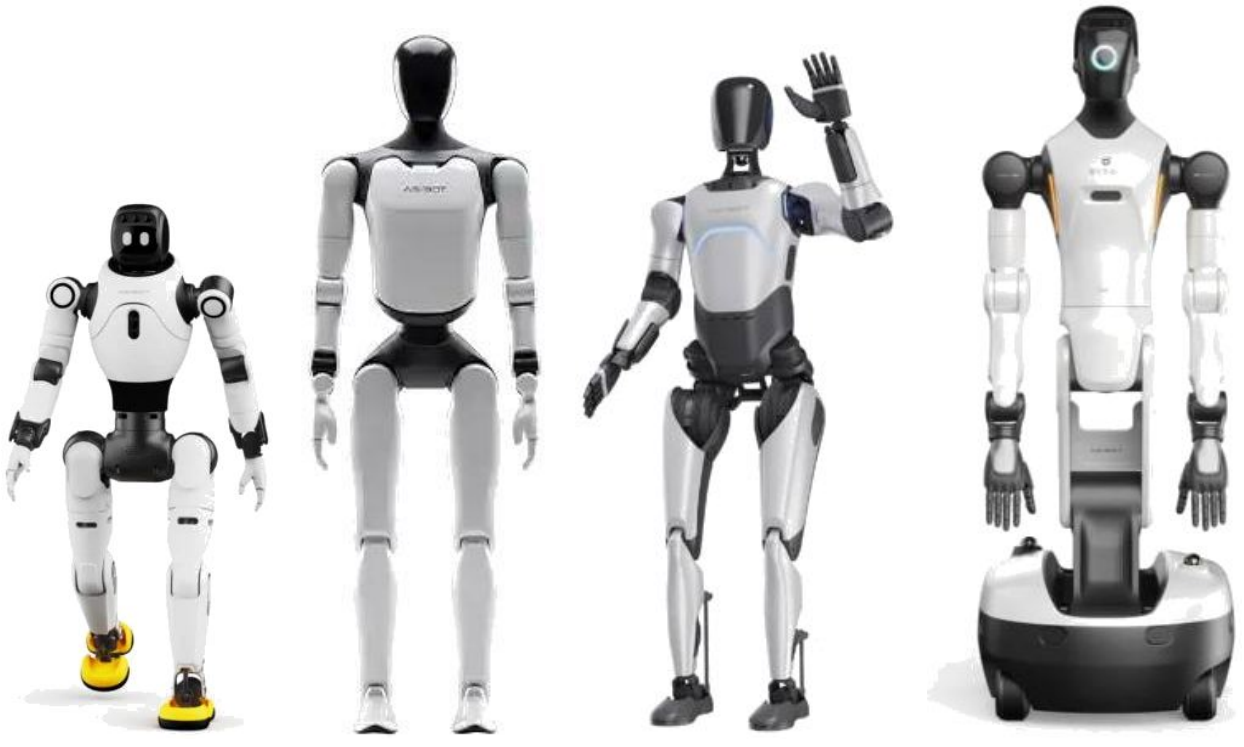
RaaSX

GUIDE FOR UNIVERSITIES AND COLLEGES

# Humanoid robots in *teaching and research*

Four Agibot platforms side by side: which model suits which field of study, how to program them and use them for research, and how to set up a lab safely.



X2 Ultra | A3 | A2 Ultra | G2

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# From lecture hall to laboratory

Humanoid robots are the testing ground for embodied AI: artificial intelligence that perceives, decides and moves in the real world. For universities of applied sciences they are a platform for practice-based research and project education; for research universities a research instrument for robotics, AI and human-robot interaction.

**Who is this for?**

Programme managers, professors, research group leaders, lab coordinators and lecturers in engineering, ICT, AI, healthcare, design and behavioural sciences.

**What is inside?**

1. Four platforms · 2. Why invest · 3. Models side by side · 4. By field of study · 5. Software and research · 6. Lab and safety · 7. Research partner and funding · 8. Options and contact

## Four platforms



### X2 Ultra

Compact and affordable, with an open SDK and its own voice assistant. The broad entry point.

131 cm · 39 kg · bipedal



### A3

Fast and expressive, built for interaction and performance, also with several robots at once.

173 cm · 55 kg · up to 10 hours



### A2 Ultra

Full-size with dexterous hands, lidar and autonomous navigation. For robotics research.

169 cm · approx. 69 kg · 40 degrees of freedom



### G2

Industrial wheeled robot with force-controlled arms. For manipulation and datasets.

185 kg · 5 kg per arm · swappable batteries

The G2 Max is not yet available in Europe; CE certification is in progress. This guide covers the G2.

# Why invest in robotics education?

A robot in the classroom is fun, but that is not the reason to invest. The Netherlands needs people who can program, deploy and maintain robots. That is also the conclusion of TNO, the Netherlands Organisation for Applied Scientific Research.

**TNO report *Without robotisation, Dutch manufacturing will disappear* (April 2026)**

**264**
robots per 10,000 employees in Dutch manufacturing

**12th**
place worldwide; South Korea, China and Germany are at 400 to over 1,000

**+50%**
productivity is the minimum needed to restore competitiveness

**7%**
of Dutch GDP comes from manufacturing

According to TNO, manufacturing is under pressure from an ageing workforce, staff shortages and high labour costs. TNO calls robotisation not a luxury but a precondition. One of its five recommendations is about education: a stronger link with the labour market through **continuous learning pathways and mandatory robotics competencies**. The report names the shortage of digitally skilled specialists who can organise automation as a key barrier.

## Three reasons to start now

### Skills in demand

Programming, sensors, safety and AI in the real world. Exactly the competencies TNO says are missing.

### Robots as co-workers

TNO expects robots to take over standardised work while people instruct and correct them. You learn that role by working with robots.

### Robotics experts and research

TNO wants more robotics experts and the Netherlands as a testbed for flexible robots. Higher education supplies those experts and the research.

Source: TNO, report 2026 R10389, April 2026 (T. Bruijne, C. Bonte and C. Stolwijk), published in Dutch. The report covers robotisation in manufacturing, not humanoids specifically. The skills it names apply to any robot; a humanoid is a broad learning platform for them.

# The models side by side

The four platforms differ in build, sensors and computing power, and so does the research you can do with them.

| FEATURE | X2 ULTRA | A3 | A2 ULTRA | G2 |
|---|---|---|---|---|
| Build | Bipedal, compact | Bipedal, full-size | Bipedal, full-size | Wheeled base with torso |
| Height | 131 cm | 173 cm | 169 cm | 122.5 to 179.5 cm |
| Weight | 39 kg | 55 kg | approx. 69 kg | 185 kg |
| Degrees of freedom | 31 | n/k | 40, incl. hands | 26, plus optional hands |
| Arms and hands | Optional OmniHand or gripper | Gestures and interaction | 7 per arm, dexterous hands | 7 per arm, force-controlled, 5 kg |
| Perception | RGB-D, stereo, rear camera, lidar, microphones | Microphones, touch sensors, UWB positioning | 3D lidar, RGB-D, RGB, fisheye, microphones | Lidar, cameras, IMU |
| Computing | Jetson Orin NX 16 GB | n/k | Jetson Orin 64 GB | Jetson T5000 |
| Energy | approx. 421 Wh | Up to 10 hours, swappable | approx. 3 hours standing | Two swappable batteries |
| Developer kit | AimDK_X2, ROS 2 | AimDK A3 | AimDK A2 Ultra, incl. low-level motion control | GDK: Python, C++, ROS 2 |
| Rent / week | €2,500 | n/a | €6,500 | n/a |
| RaaS / month | **€1,969** | **€3,988** | **€3,988** | **€5,894** |
| Purchase | €39,000 | €79,000 | €79,000 | €116,750 |

RaaS based on 36 months. Amounts exclude VAT and shipping. Specifications per Agibot, the Agibot developer documentation and European distributors; n/k means not publicly known. A2 Ultra computing per distributor.

### Legs or wheels?

Walking and balance are research topics in themselves on the X2, A3 and A2 Ultra. For object handling, the wheeled G2 works calmer and longer.

### One developer kit per line

Each line has its own kit, all on ROS 2 Humble with Python and C++. Code does not transfer directly between models; the concepts do.

# Which model suits your field of study?

Our advice per field. Many institutions start with one X2 Ultra for teaching and add an A2 Ultra or G2 for research.

| FIELD OF STUDY | ADVICE | WHY | EXAMPLE PROJECT |
|---|---|---|---|
| **Robotics and mechatronics** (bachelor, master) | A2 Ultra; G2 for manipulation | 40 degrees of freedom and a separate guide for custom motion control | Own balance or walking controller, in simulation first |
| **Mechanical and electrical engineering** | X2 Ultra | Light, affordable, all sensors readable | Analysing energy use and motor temperature |
| **ICT, software engineering, embedded systems** | X2 Ultra | ROS 2 and Python, a development computer inside the robot | A tour guide robot built from own ROS 2 nodes |
| **AI, data science, computer science** | G2; A2 Ultra | Force-controlled arms, open dataset and simulator for imitation learning | Training a task model in Genie Sim and testing it on the G2 |
| **Industrial engineering, logistics, smart industry** | G2 | Wheeled base, 5 kg per arm, continuous work with swappable batteries | Pick and place in a test set-up |
| **Human-robot interaction, psychology, communication** | X2 Ultra; A3 | Speech, face, gestures and your own AI assistant | Study of trust in a talking robot |
| **Healthcare and social care** (social robotics) | X2 Ultra | Compact, approachable, speech and expression | Support scenario in a care skills lab |
| **Creative technology, design, performing arts** | A3 | Fast and expressive, choreography without code, robots in formation | A performance with several robots |

## Our advice

To start broadly in teaching and projects, choose the X2 Ultra: the lowest threshold and the most complete developer kit per euro. If your research centres on manipulation, datasets or custom motion control, choose the A2 Ultra or the G2. The A3 suits interaction, design and the performing arts. Not sure? Rent an X2 Ultra or A2 Ultra for a week first.

# Software and research

Agibot supplies more than robots: also developer kits, a simulator, an open dataset and its own AI models. This is what your researchers and students can use.

| COMPONENT | WHAT IT IS | ACCESS |
|---|---|---|
| **AimDK and GDK** | Developer kits per robot line on ROS 2 Humble, with Python and C++. From gestures and speech to joint level. | Documentation public; login via RaaSX |
| **Genie Sim** | Agibot's simulation platform, version 3.0 announced in 2026. Lets groups work without the real robot. | Open source on GitHub |
| **AgiBot World** | Open dataset of real robot tasks, including teleoperation and whole-body data. Suited to theses and PhD research. | Open |
| **Genie Studio** | Data collection, teleoperation in simulation via VR or keyboard, and training models such as RDT, Pi0, OpenVLA, GR00T and GO-1. | Via Agibot, on request |
| **GO-1 and GO-2** | Agibot's own foundation models that perceive, understand language and drive actions. | Via Genie Studio |
| **LinkCraft and LinkSoul** | Creating movements without code, and setting personality and voice via the Agibot cloud. | Mind privacy, see below |

### Three control levels

- **High**: gestures, speech, navigating to a point on the map
- **Mid**: walking speed, arm and head position
- **Low**: joints and motors; on the A2 with a dedicated motion control guide

The G2's Cartesian arm control has no built-in collision detection. Test in simulation first.

### Language models and AI agents

A language model such as Claude can choose from a fixed list of safe skills through a custom connection (MCP), while balance and motion stay on the robot. A strong research topic.

From 12 November 2026, Anthropic's usage policy requires human oversight and limits enforced outside the model for robots operating among people.

According to its own privacy policy, LinkSoul processes data in locations including China and Singapore. Do not use it with study participants without review by your data protection officer or ethics committee.

# Setting up the lab, safely

A humanoid robot is a machine of 39 to 185 kilograms. A well-equipped lab makes the difference between a quick experiment and a broken robot.

### Space

A fixed, marked-out test area with a level floor. The G2 is built for indoor use (IP42). For walking research with bipedal robots we recommend fall protection, such as a hoist or harness.

### Emergency stop and supervision

An emergency stop or remote control always within reach of a supervisor. Software, including AI, is never the emergency stop.

### Network

The robots use a fixed wired connection, for example 10.0.1.x for the X2 and 10.42.1.x for the G2. Give the lab its own isolated network segment.

### Simulate first

New controllers and AI models first in Genie Sim or Isaac Sim, then on the robot at low speed. Set limits in software the AI cannot change.

## Regulations to keep in mind

| REGULATION | WHAT IT MEANS FOR YOUR LAB |
|---|---|
| **Machinery Regulation (EU) 2023/1230**, from 20 January 2027 | Anyone who substantially modifies a machine in a way the manufacturer did not foresee may count as its manufacturer. Consult beforehand if you change the control system or safety functions. |
| **AI Act** | Obligations for AI in machinery have been postponed to 2 August 2028. Research into AI control remains possible, with good documentation. |
| **Privacy (GDPR)** | Camera and voice data of study participants require consent and ethical review. |

Not legal advice. RaaSX can help and will check questions about intended use with Agibot.

# Become a research partner: we are working on funding

RaaSX is preparing a grant application to bring programming and research with humanoid robots into education on a structural basis. We are looking for universities and colleges to join as research or teaching partners.

### Where we stand

We are preparing an application and exploring several regional and national schemes for innovation in education. Nothing has been awarded yet, so we deliberately name no amounts.

### For your own application too

If your institution submits its own research proposal, RaaSX can provide a letter of support, a quote and a technical description of the platform, and can take part as a practice partner.

## Our proposal

| STEP | WHAT HAPPENS | FROM YOUR INSTITUTION |
|---|---|---|
| **1. Introduction** | We discuss your research questions and courses, and which model fits. | A meeting with a professor or programme manager |
| **2. Letter of intent** | Your institution states its interest in a pilot or research project. | A short letter, without financial obligation |
| **3. Application** | RaaSX submits its application, or provides input for yours. | Agreement on planning and roles |
| **4. Delivery** | If awarded, the project starts, with RaaS including maintenance service. | A dedicated contact and a lab |

### What if the grant does not come through?

Then your institution is not committed to anything. You can still rent a robot or use one via RaaS at the regular rates.

## Sign up your institution as a partner

Email sales@raasx.nl or call +31 30 269 0012.

Sign up

# Rent, RaaS or buy

For teaching and research we recommend: try it for a week first, then choose RaaS. The robot stays in your lab for the whole project and RaaSX takes care of maintenance.

| OPTION | TERM | INCLUDED | SUITS |
|---|---|---|---|
| **Rental** | Per week, cancellable weekly | Robot under the RaaSX rental agreement; no SLA. For X2 Ultra and A2 Ultra. | Trial week, project week, open day |
| **RaaS** | 36 months | Maintenance service: monitoring, preventive maintenance, updates and repair work. Parts under manufacturer warranty. Response next business day. | Degree programme, research group, PhD project |
| **Purchase** | One-off | Robot; service via a separate service agreement | Institutions with their own technical service |

Rates per model are on page 4. Amounts exclude VAT and shipping. We budget integration per project.

### What RaaSX does

- Advice on model and set-up
- Delivery and briefing at the start
- Requesting SDK access from Agibot
- Contact with Agibot support for faults

### What your institution arranges

- A marked-out test area
- A dedicated lab contact
- Ethics and privacy review of research
- Power and an isolated network

RaaSX

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Book an introduction