RoboCup 2026 Humanoid Soccer League
Robo-Erectus
Hardware specifications

Our team has adopted Booster Robotics T1 humanoid robot for our team. Which it is one of the standard platform robots selected by the league. We currently have two T1 robots, we intend to borrow one more robot during the matches from the poll of robots that Booster Robotics will provide. Our T1 robots have not been modified or altered, they still use the currently the same computer that is shipped with the robot from the factory.

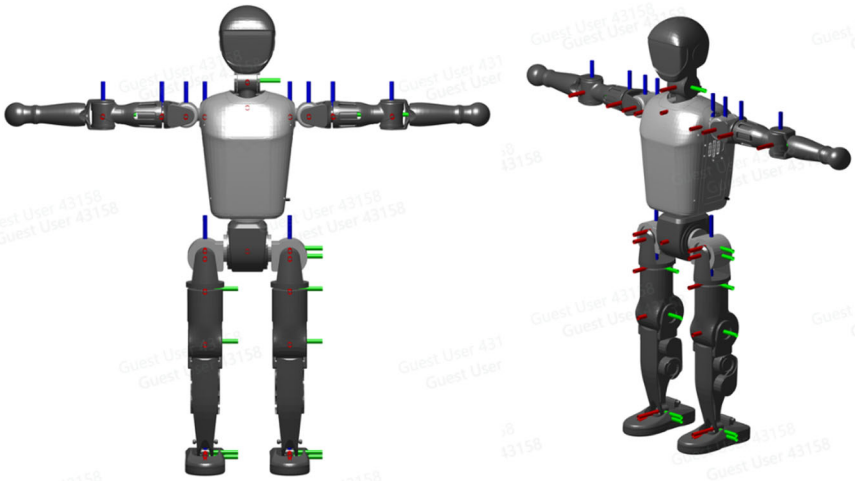

Figure 1. Booster Robotics T1 humanoid robot overview of the 23 degrees-of-freedom in the robot.

Figure 1 illustrates the Booster Robotics T1 humanoid robot, which is adopted as one of the standard platforms for the RoboCup Humanoid Soccer League, Large Division competition. The T1 robot has overall dimensions of 118cm × 47cm × 23cm and a total mass of approximately 30 kg, including the onboard battery. Its mechanical configuration consists of a head, torso, two arms, and two legs, providing a total of 23 degrees-of-freedom (DoFs) to support full-body motion and posture control.

The head features 2 DoFs (yaw and pitch) and integrates a depth camera, microphone array, and speaker, enabling active visual scanning, perception, and object tracking. Each arm is equipped with 4 DoFs (shoulder pitch, roll, yaw, and elbow), allowing for balancing actions and basic manipulation; the arm modules are designed with extensibility in mind to accommodate future enhancements. The waist incorporates 1 DoF (yaw), which improves turning capability and coordination between the upper and lower body. Each leg provides 6 DoFs (hip pitch, roll, and yaw; knee; and ankle pitch), supporting dynamic locomotion, directional changes, and recovery behaviors essential for humanoid soccer play.

Table 1. Specifications of the electronic components in the Booster Robotics T1 Humanoid Robot.

Category	Sensor / Device	Description
Vision	RGB-D / Depth Camera	3D perception camera for environment mapping, object detection, and navigation
Orientation / Motion	9-axis IMU	Inertial Measurement Unit with accelerometer, gyroscope, and magnetometer for balance and orientation
Audio Input	Microphone Array	Multi-microphone array for voice capture and sound localization
Audio Output	Speaker	Built-in speaker for audio feedback and interaction
Joint Feedback	Joint Encoders	High-resolution encoders on each joint for position and velocity feedback
Range Sensing (Optional)	3D LiDAR	Optional LiDAR for long-range sensing and SLAM
Computing	NVIDIA Jetson AGX Orin	Main AI computer for perception, planning, and autonomy
Computing	Motion Control CPU	Secondary processor for real-time motor and joint control
Connectivity	Wi-Fi 6	Wireless networking for remote control and data transfer
Connectivity	Bluetooth 5.2	Short-range wireless communication
Connectivity	Gigabit Ethernet	Wired high-speed network interface
Connectivity	USB Interfaces	Peripheral and sensor expansion ports
Power	Battery Pack	Rechargeable lithium battery system
Power	Safety & Power Management	Battery monitoring, thermal protection, and power distribution

The main control board and battery are housed within the torso to centralize mass distribution and protect critical electronics. Table 1 shows a complete list of the components inside the Booster Robotics T1 humanoid robot. The robot's link dimensions include a leg length of 57cm and an arm length of 45cm, contributing to stable locomotion and providing a sufficient operational workspace for soccer-related tasks.