

Spot[®]

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Academia & Innovation Kit



ACADEMIA & INNOVATION

The next generation of mobility, sensing, and manipulation. Spot's features serve research efforts across a wide range of industries - from construction to manufacturing, energy & utilities, oil & gas, and more.

Agile

Explore unstructured terrain with unprecedented mobility, going where wheeled robots and drones cannot. Spot cruises over loose gravel, grass, curbs, and stairs by automatically engaging gaits designed to optimize stability.

Customizable

Spot's open platform for sensing and manipulation offers the flexibility you need for research and education. With out-of-the-box functionality, Spot can handle its own mobility, autonomy, and navigation while you augment the robot in the area of innovation most interesting to you.

Intuitive

Whether you're putting Spot to use out of the box with its easy-to-learn tablet controller, or developing a custom application with Spot's API, we have the resources to support you. Get started with Spot in under an hour, with comprehensive support and training offerings to help you scale.

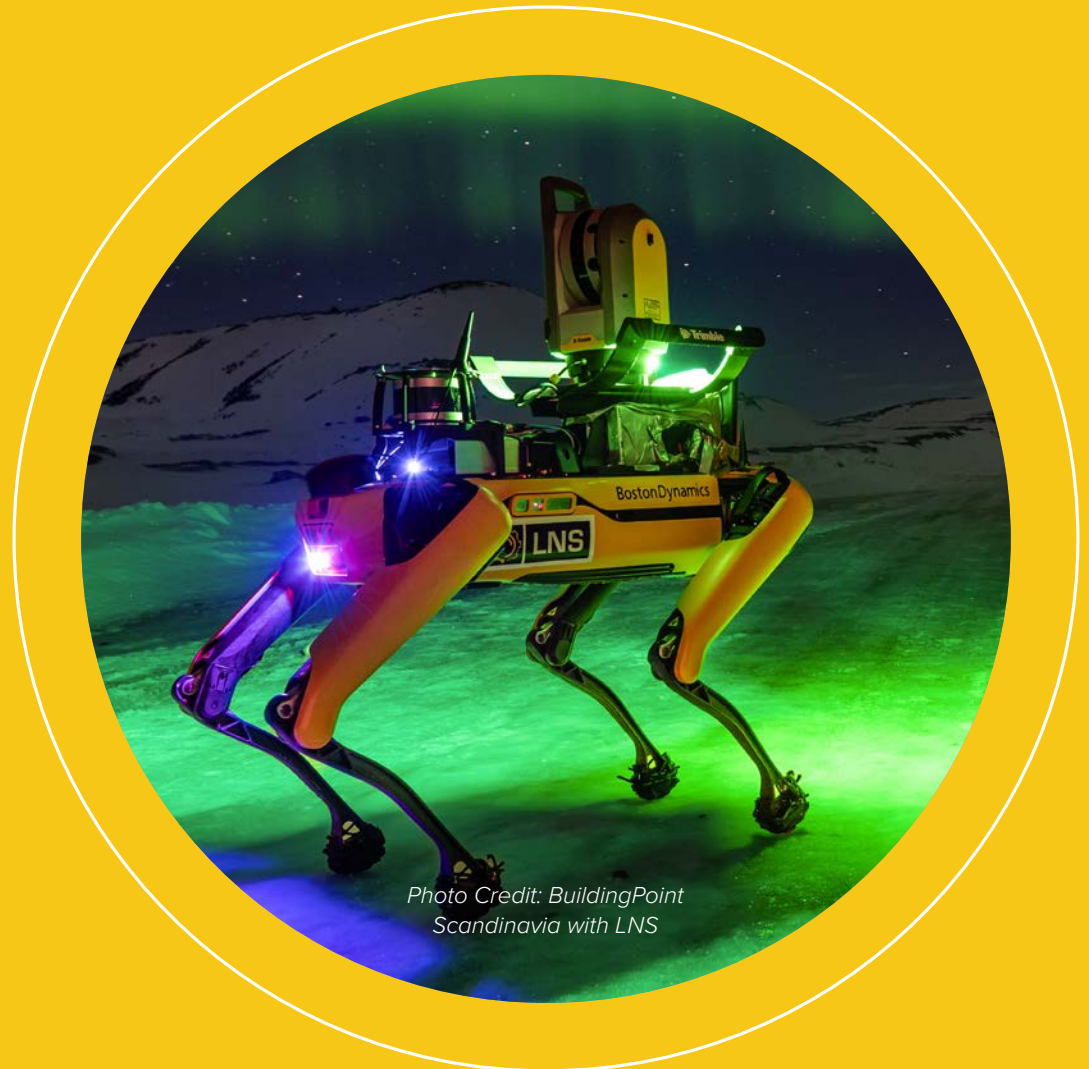


Photo Credit: BuildingPoint
Scandinavia with LNS



Autonomy

Spot comes with Autowalk, a feature that allows users to record and replay autonomous missions that can include actions such as data collection and API callbacks. For even more sophisticated autonomy solutions, developers have access to the broader autonomous navigation API that Autowalk is built on.



Manipulation

The Spot Arm allows the robot to interact with the world around it. Through the intuitive tablet interface or the API, users can choose from manual, semi-automated, or fully automated arm actions, such as maneuvering or inspecting objects with the gripper, and even turning valves, flipping levers, and opening doors.



Data Collection & Analysis

Spot's cameras and any attached sensors collect data that can be processed on-robot through the Spot CORE I/O or sent off-robot to be processed elsewhere. Integrate third-party computer vision models, enterprise asset management (EAM) systems, and more.

KIT INCLUDES:

SPOT ROBOT

SPOT CARE

SPOT ARM




SPOT CORE I/O



SPOT ARM

Equipped to operate through both semi-autonomous actions and telemanipulation, the arm will open doors, pick, place, push, or drag objects, and adapt to new situations at the push of a button or swipe of a screen.




Features:

-  6 degrees of freedom plus a gripper
-  Semi-automated manipulation options
-  Carries up to 11kg (24 lbs)

SPOT CORE I/O

Spot CORE I/O enhances both the computation and communications available on the Spot platform. Easily configure inputs such as sensors, cameras, and other devices to Spot and process data collected into actionable insights.


Features:

-  Compact CPU and GPU with customizable inputs and outputs
-  5, 12, and 24V regulated power output
-  RJ45 standard ethernet adapter
-  Built-in 5G/LTE modem with CBRS support for private networks

SPOT CARE

One year of premium service and support to keep your robot up and running at peak performance.

Features:

-  Free damage protection*
-  Part replacement
-  Quick repair turnaround

*Improper use of Spot is not covered under Spot CARE. See our [Spot CARE Terms and Conditions](#) to see what constitutes improper use.



SPOT SPECIFICATIONS

Academia & Innovation Kit

DIMENSIONS WITH PAYLOADS

Length 1100 mm (43.3 in)	Max Height (Walking) 946 mm (37.2 in)
Width 500 mm (19.7 in)	Min Height (Walking) 766 mm (30.2 in)
Height (Sitting) 437 mm (17.2 in)	Net Mass/Weight (Including battery) 43.5 kg (95.9 lbs)
Default Height (Walking) 856 mm (33.7 in)	

LOCOMOTION

Max Speed 1.6 m/s
Max Slope ±30°
Max Step Height 300 mm (11.8 in)

AUDIO & VISUAL SIGNALS

Pre-configured behaviors for manual and autonomous operations

LED Brightness
Adjustable up to 1010 Lux

Max Projection Distance
1.8 m in front of robot

Buzzer Volume
Adjustable up to 110 dB at 1 m distance from robot

TERRAIN SENSING

Horizontal Field of View
360°

Range 4 m (13 ft)

Lighting > 2 Lux

Collision avoidance
maintains set distance from stationary obstacles

CONNECTIVITY

WiFi
2.4GHz / 5GHz b/g/n Ethernet

Environment Ingress Protection
IP54

Operating Temp.
-20°C to 45°C

BATTERY

Battery Capacity
564 Wh

Average Runtime
90 mins

Standby Time
180 mins

Recharge Time
60 mins

Length
324 mm (12.8 in)

Width
168 mm (6.6 in)

Height
93 mm (3.7 in)

Mass/Weight
5.2 kg (11.5 lbs)

CHARGER

Input Voltage
100-240VAC, 50/60Hz 8A Max

Output
35-58.2 VDC, 12A Max

Length
380 mm (15.0 in)

Width
315 mm (12.4 in)



Height

178 mm (7.0 in)

Mass/Weight

7.5 kg (16.5 lbs)

Operating Temp.

0°C to 45°C

TABLET WITH JOYSTICKS**Height**

138 mm (5.4 in)

Width

286 mm (11.3 in)

Depth

56 mm (2.2 in)

Weight

546 g (1.2 lbs)

Touch Screen Size

8" diagonal

Interface Controls

2x Joysticks, 2x 5-direction buttons, and 2x bumper buttons

Resolution

1920x1200

Battery Life

Up to 5 hours

Ingress Protection

Rain and dust resistant

SAFETY AND COMPLIANCE, UNITED STATES

Designed according to ISO 12100 for risk assessment and reduction methodology and IEC 60204-1 for electrical safety. See [Information for Use](#) for further details on intended uses.

Emergency Stop meets ISO 13850

EMC: FCC Part 15B Radio equipment:

Incorporates a FCC Part 68 Certified radio system

Laser product

Class 1 eye-safe per IEC 60825-1:2007 & 2014

SPOT ARM**Degrees of Freedom**

6 + gripper

Length (at full extension)

984 mm (38.7 in)

Max. Endpoint Speed

10 m/s

Max. Lift Capacity**

Up to 11 kg (24.3 lbs)

Continuous Lift Capacity**

(at 0.5 m extension)
5 kg (11 lbs)

Max. Drag Capacity**

(on carpet)
Up to 25 kg (55.1 lbs)

Max. Reach Height

1800 mm (70.9 in)

GRIPPER**Depth**

90 mm (3.5 in)

Max Aperture

175 mm (6.9 in)

Peak Clamp Force

(at tip of opening)
130 N

Integrated Sensors

Accessory Port, ToF, IMU, 4K RGB, Gigabit Ethernet, 50W power, camera sync (PPS)

**Payload capacities measured at 22°C

SPOT CORE I/O**PROCESSING****(JETSON XAVIER NX)****CPU**

6-core NVIDIA Carmel ARM V8.2 64-bit CPU with 6MB Lw + 4MB L3 cache

GPU

384-core NVIDIA Volta GPU with 48 Tensor cores

Memory

16GB 128-bit LPDDR4x at 51.2 GB/s

CONNECTIVITY AND STORAGE**5G/LTE**

User-installable SIM card. AT&T is the supported 5G provider in the United States; however, customers also have the option of utilizing their own private 5G network. For international customers, users must obtain their own SIM from a local carrier for which there may be additional network restrictions.

Ethernet

GbE interface, unmanaged 2 port Ethernet switch for additional connectivity

Storage

512GB SSD‡

USB 3.1

2x USB 3.1 ports with support for 4.5W

USB-C

1x USB-C port with support for 50W power delivery and video out

SD Card

1x SD card slot

Other Connections

E-Stop interface
PPS output
GPIO (Configurable to PWM output)
I2C Ports

Power Outputs

48V
24V, 50W
12V, 50W
5V, 30W

‡Actual storage available will be less due to operating system.

SECURITY**Disk Encryption**

SSD encrypted with standard LUKS technology

Network Encryption

Connections encrypted with TLS 1.2 and 1.3

Authentication

Access to services restricted to authenticated users

Secure Boot

Tamper-proof filesystem with hardware root of trust

Firmware Verification

Firmware updates must be cryptographically signed



*Photo Credit: BuildingPoint
Scandinavia with LNS*

GET STARTED WITH SPOT TODAY.

Contact our sales team to learn more about how you can implement the robot on your team:
www.bostondynamics.com/spot-sales

Visit our website at:
www.bostondynamics.com

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