

# Spot<sup>®</sup>

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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.

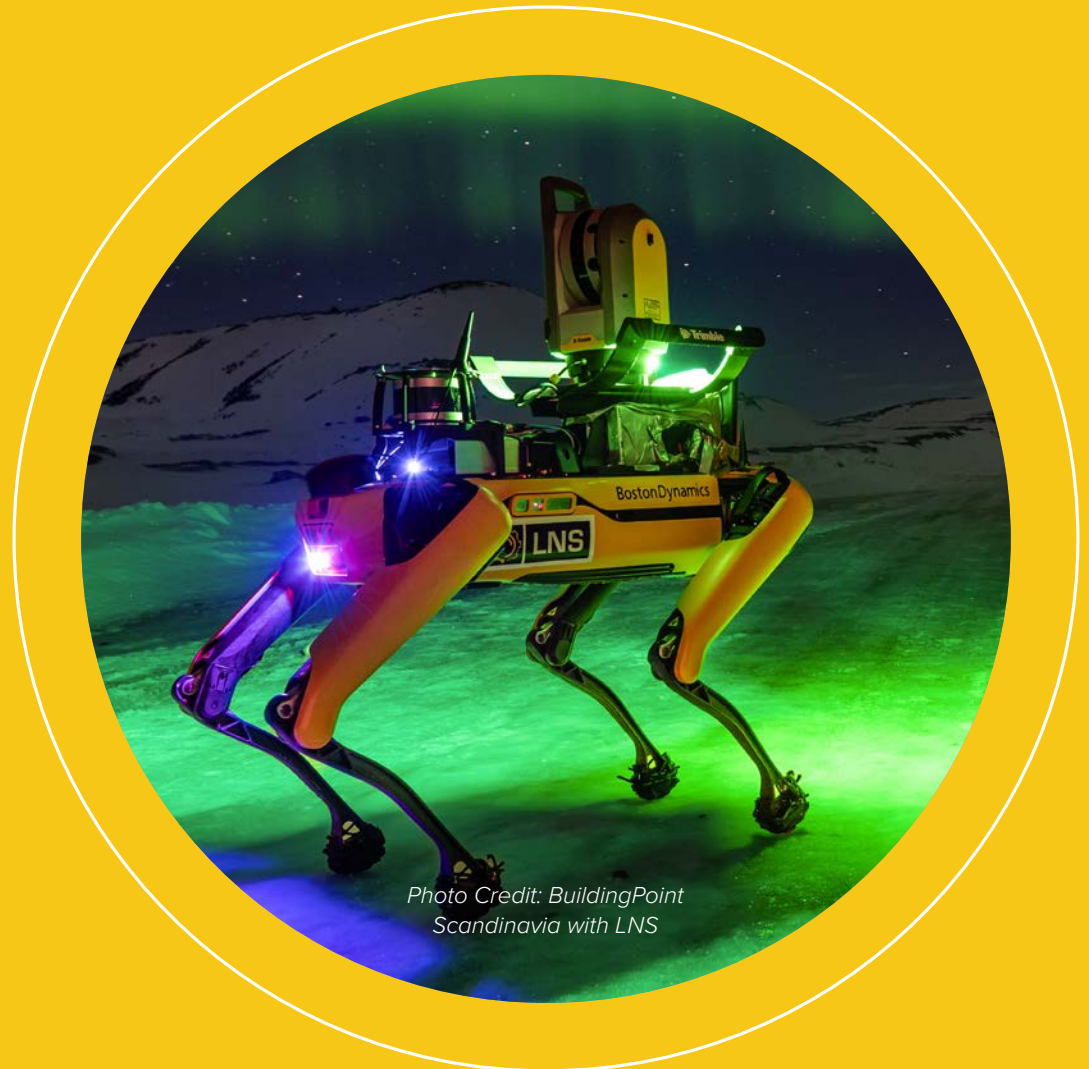


Photo Credit: BuildingPoint  
Scandinavia with LNS





## 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

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

### LOCOMOTION

<b>Max Speed</b> 1.6 m/s
<b>Max Slope</b> ±30°
<b>Max Step Height</b> 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](http://www.bostondynamics.com/spot-sales)

**Visit our website at:**  
[www.bostondynamics.com](http://www.bostondynamics.com)

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