Atlas

A one-of-a-kind humanoid robot

Boston Dynamics

History

MIT spin-off to Boston Dynamics company

1992

Google acquired company

2013

SoftBank acquired company

2017

Boston Dynamics acquires Kinema Systems

2019

To optimize 3D vision for its robots

Associate to French Shark Robotics for COVID decontamination robot

2020

The Spot robot is deployed by the Ukrainian government in Chernobyl to measure radiation levels.

Hyundai Motor takes 80% stake in Boston Dynamics

2021

Boston Dynamics

Spot

an agile mobile robot that navigates terrain with unprecedented mobility, allowing you to automate routine inspection tasks and data capture safely, accurately, and frequently.

Boston Dynamics

Stretch

a flexible autonomous mobile robot that automates case handling tasks for more efficient warehouse operations.

Boston Dynamics – Research

Atlas history


Analysis of flat terrain for the Atlas robot

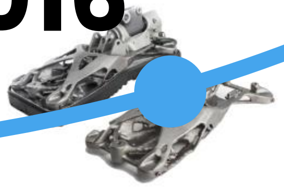
Atlas project launch

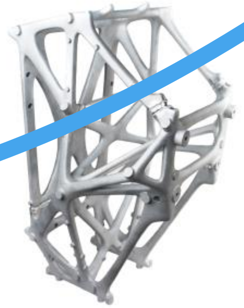
2013

Tests, Pros/cons

New design

2016





Backflip

2021

Dance

2022

Cobot

2022

Soft n hardware optimised

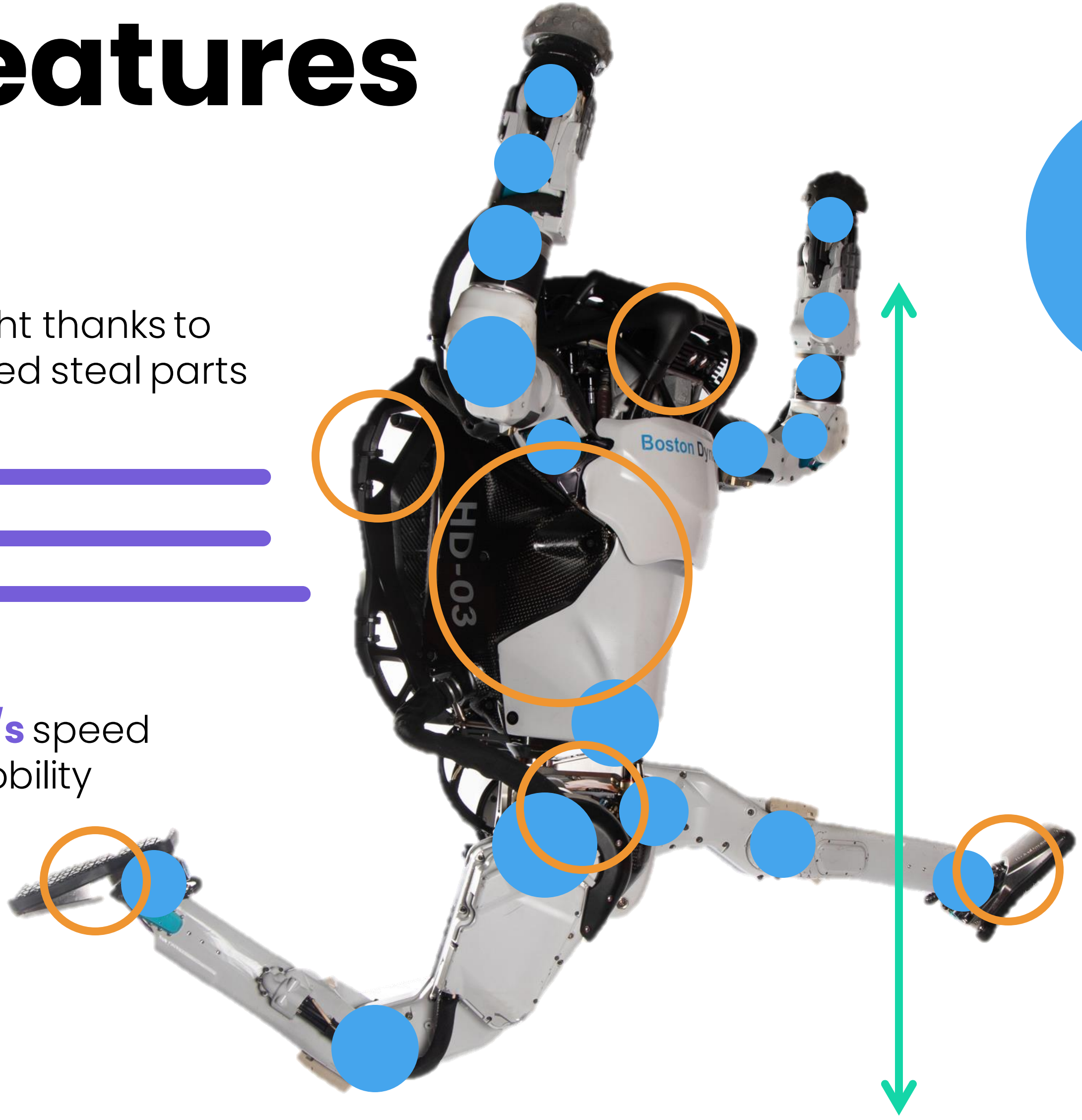
2022

Increase mobility

2022

Boston Dynamics – Research

Atlas features



89 **kg** weight thanks to 3D printed steal parts

2,5 **m/s** speed mobility

28 **hydraulic joints** for impressive feats of mobility.

1,5 **meter** height

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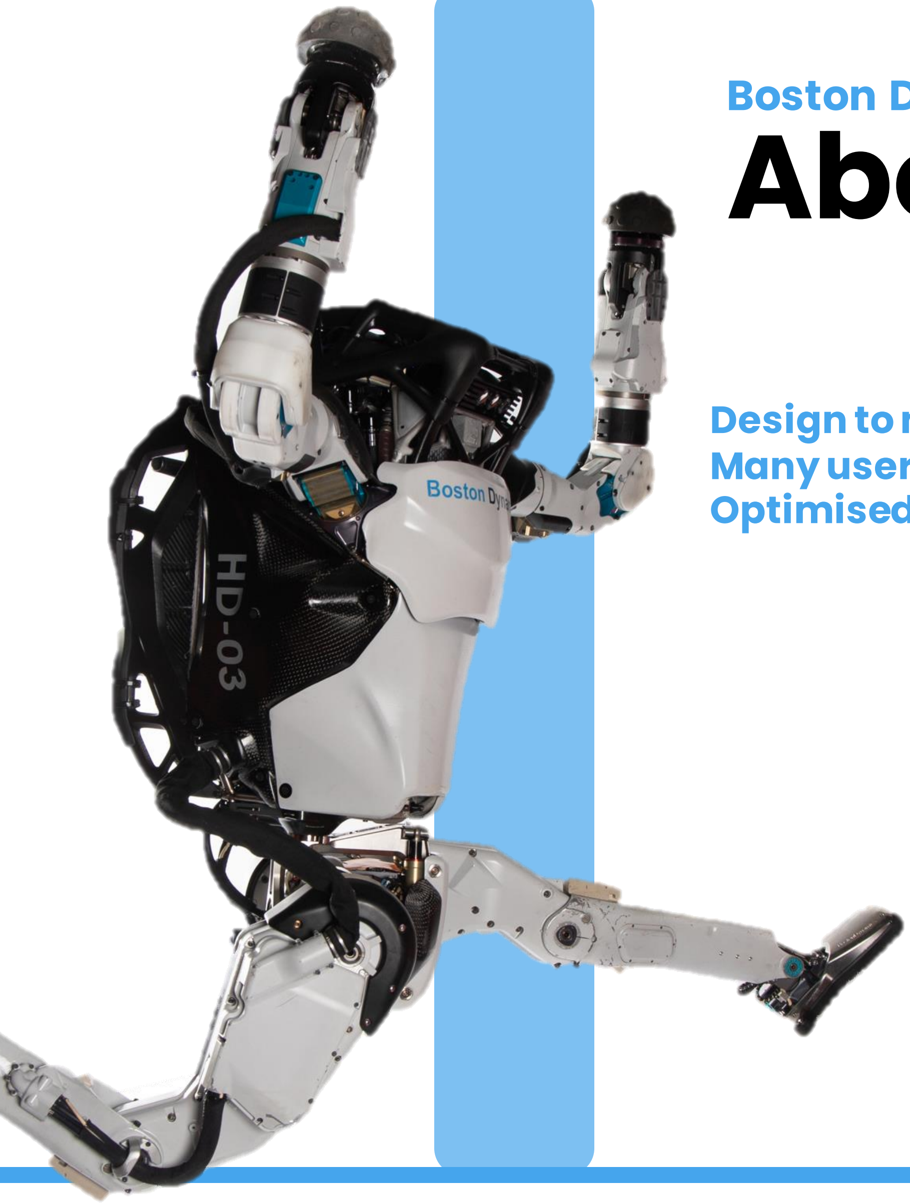
Above all competition



Design to manufacturing
Many user experience thanks to Spot
Optimised Software and Hardware

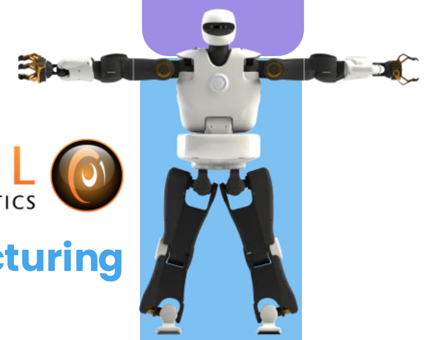
No user experience but
quick design tanks to Tesla
motors technologies

Few user experience but
define use cases

Agility Robotics

TESLA

Laboratory tests
LAAS CNRS



PAL ROBOTICS

Manufacturing
only

1992

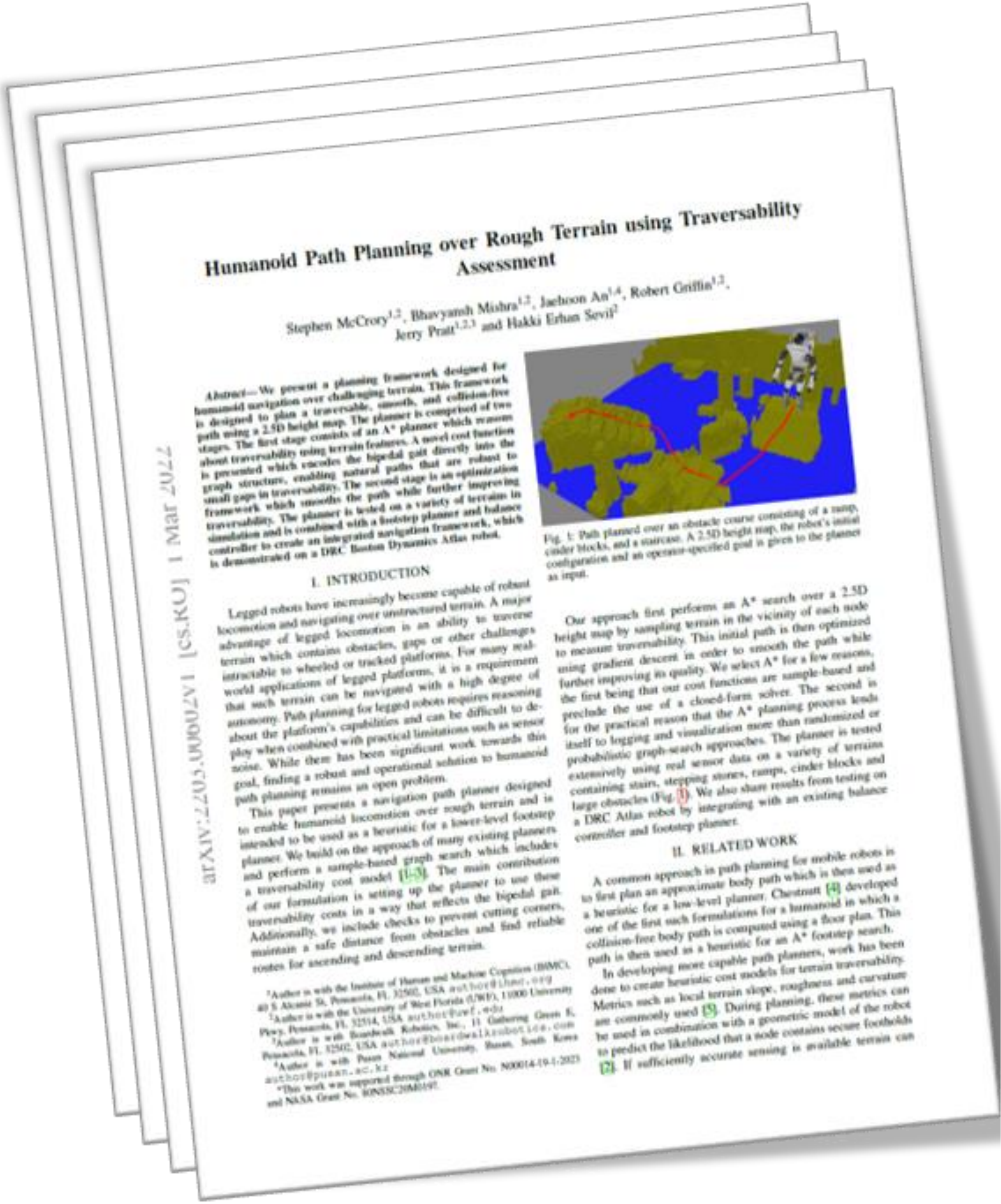
2004

2015

2021

Boston Dynamics – Research – The paper

Humanoid Path Planning over Rough Terrain using Traversability Assessment


Humanoid Path Planning over Rough Terrain using Traversability Assessment

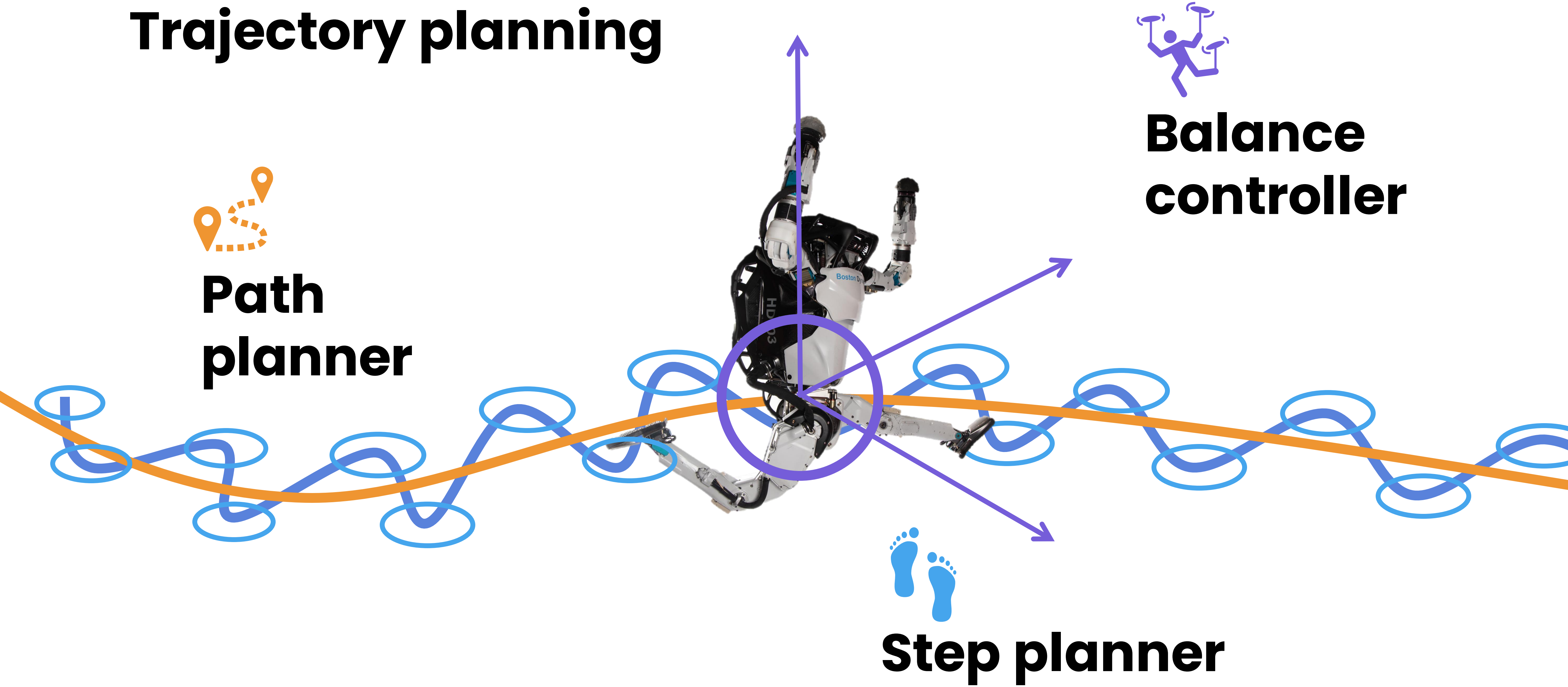
Stephen McCrory[1,2], Bhavyansh Mishra[1,2], Jaehoon An[1,4], Robert Griffin[1,2], Jerry Pratt[1,2,3] and Hakki Erhan Sevil[2]

I. INTRODUCTION

II. RELATED WORK

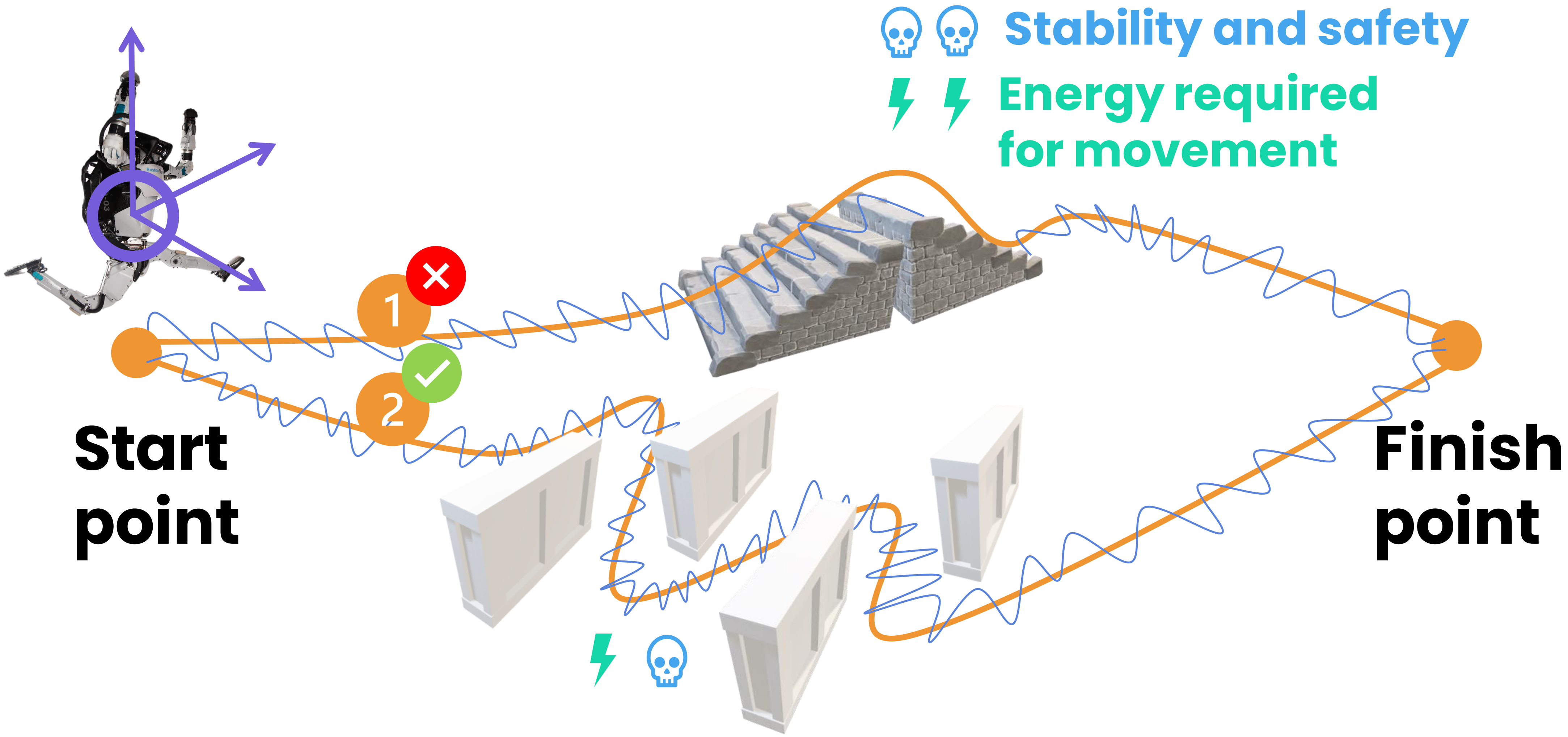
Technical data

Trajectory planning



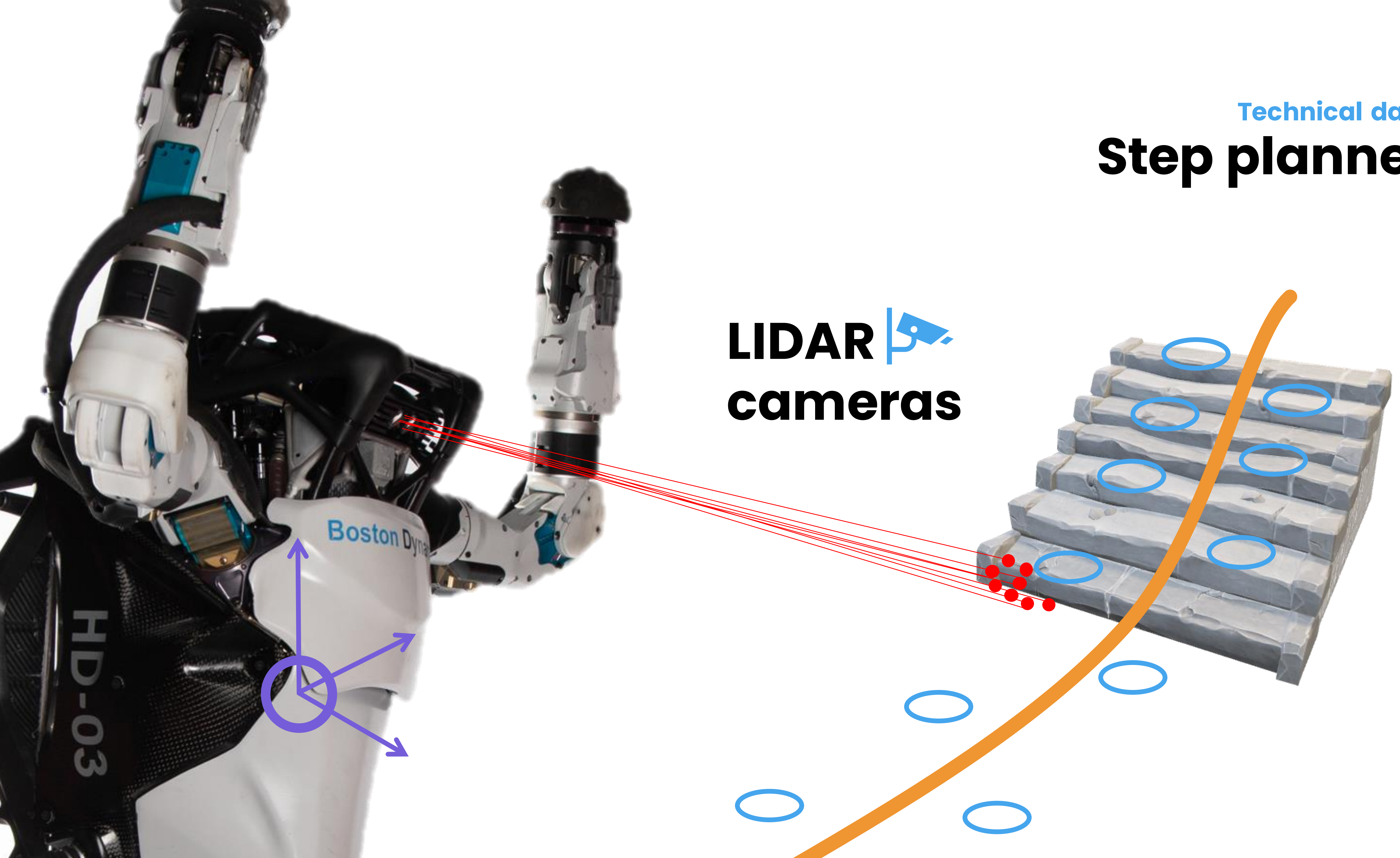
Technical data

Optimal trajectory



Technical data

Step planner



Technical data

Papers pictures

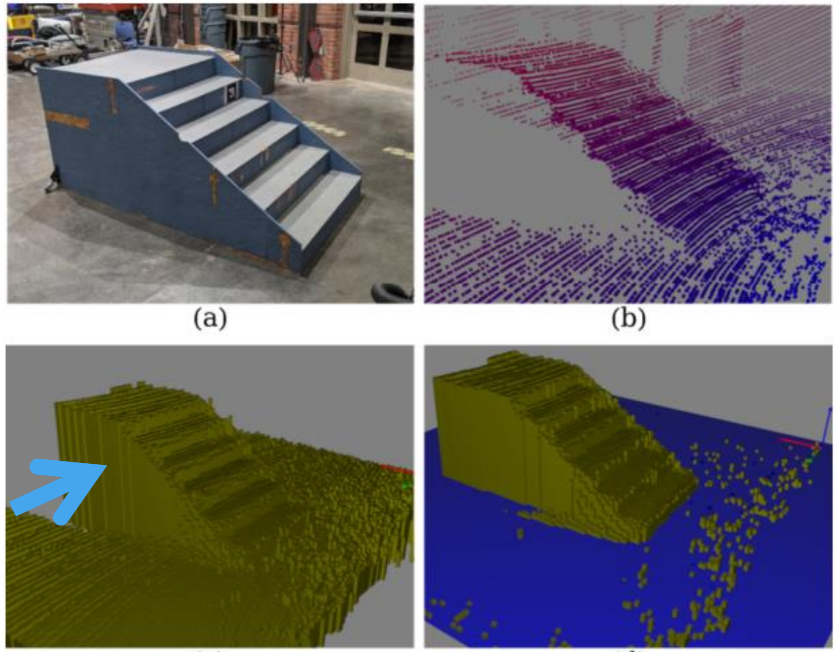


Fig. 5: The height map is built using point clouds from an Ouster OS0-128 LIDAR. Points within the height map's domain are then assigned a cell, merged with previous data, then filtered to estimate the ground plan and remove outliers.

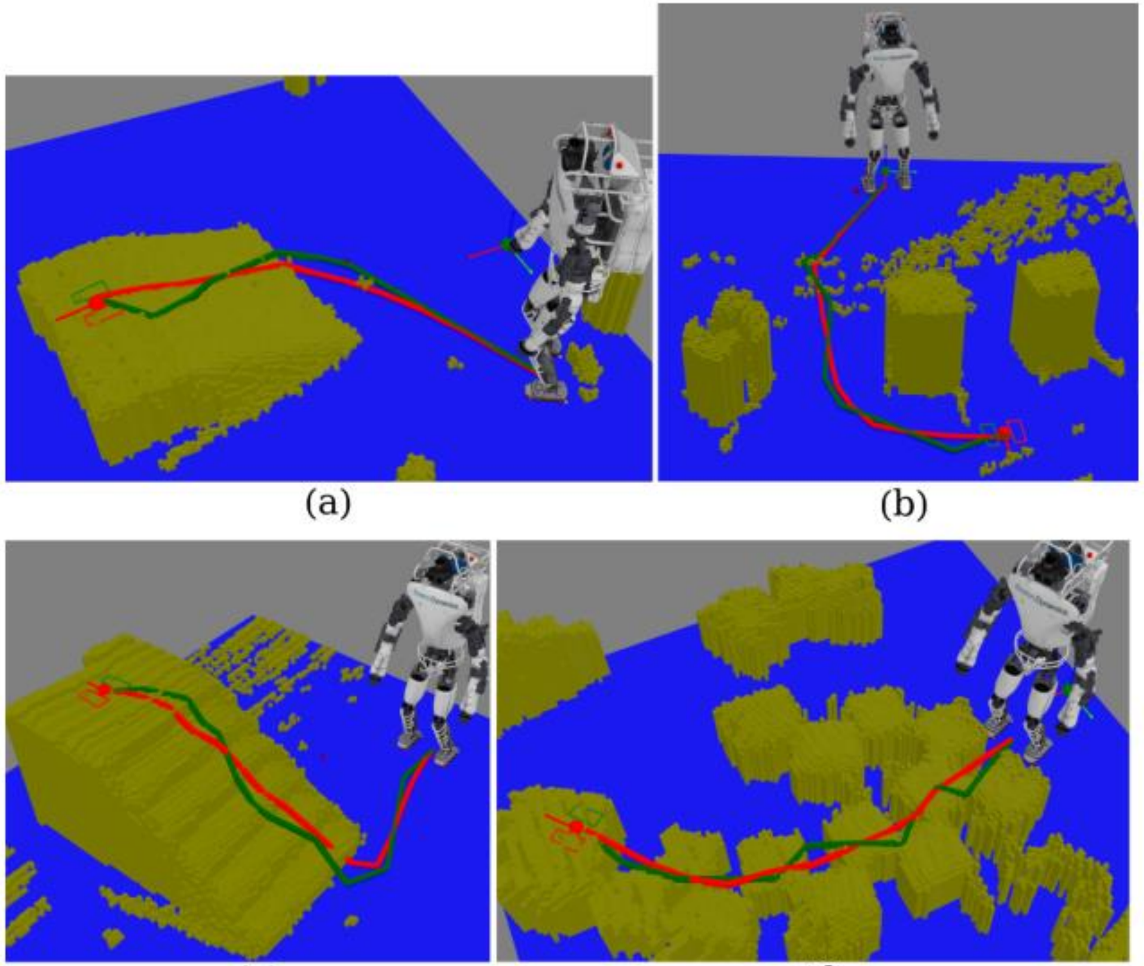


Fig. 6: Simulation results for various rough terrains using real sensor data. The green path shows the initial path generated by A* and the red is the optimized path.

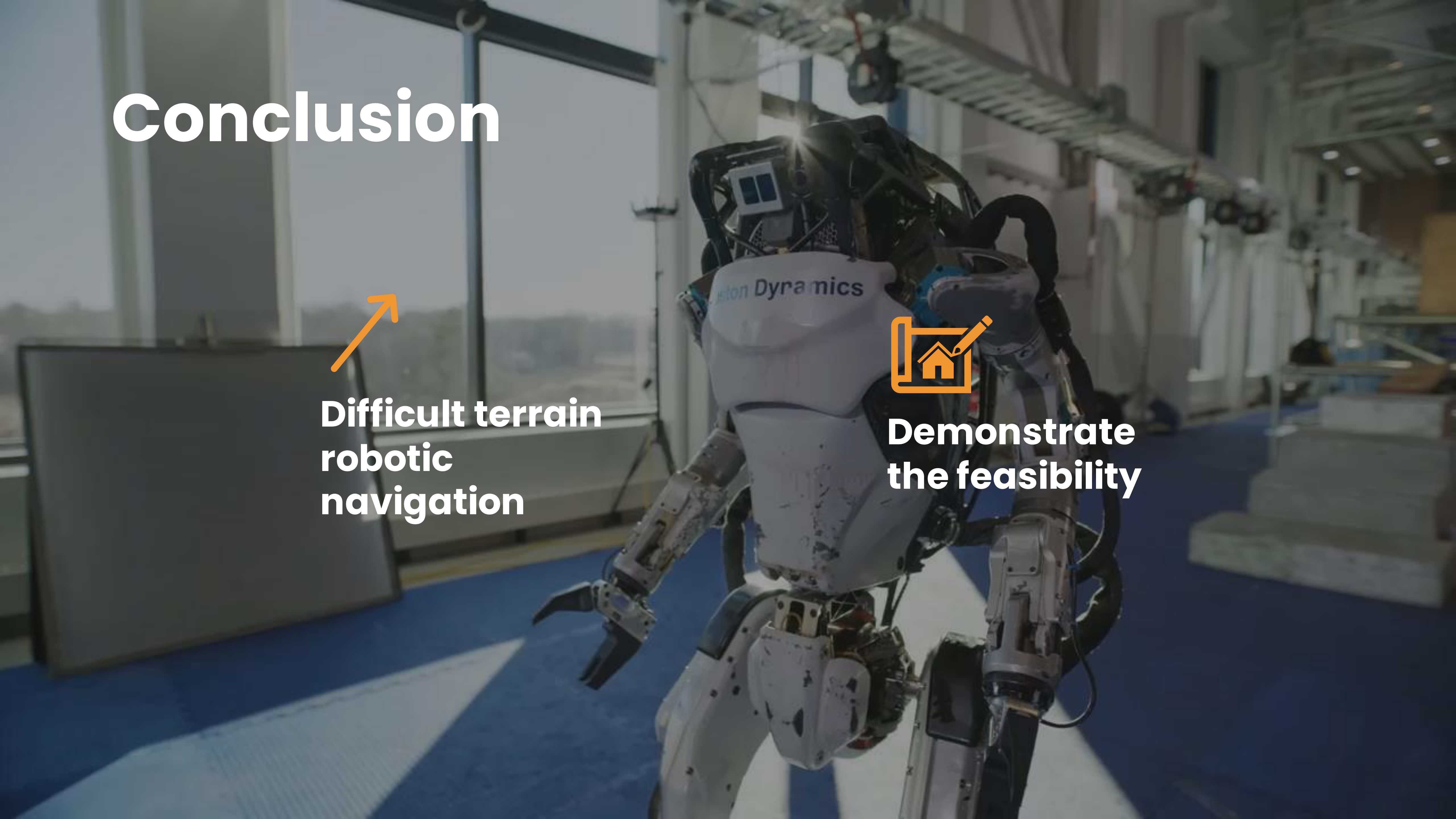
Technical data

Problems

variety of challenging terrains

"dead end" problems

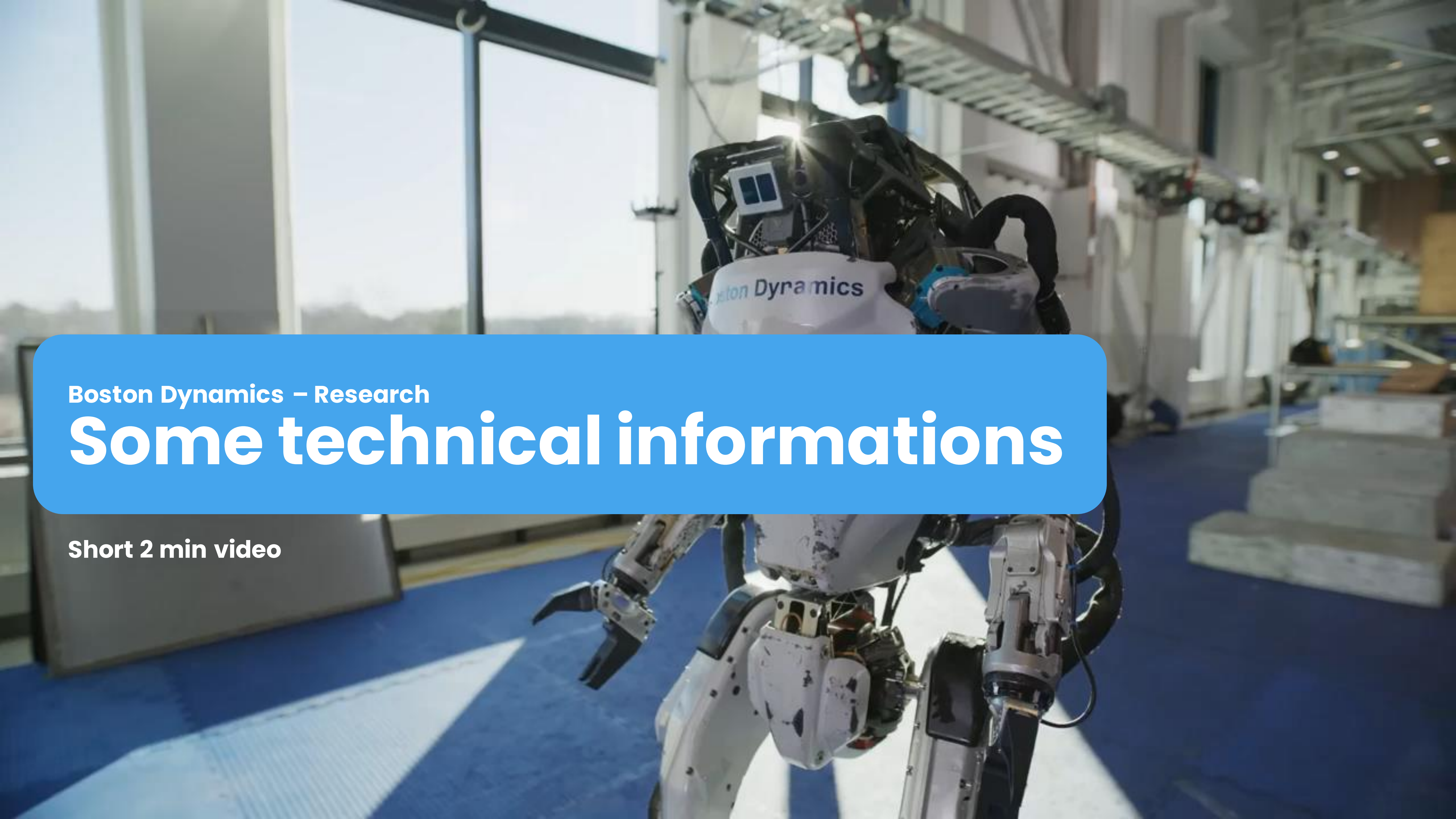
Time for impossible directions



Conclusion

Difficult terrain robotic navigation

Demonstrate the feasibility



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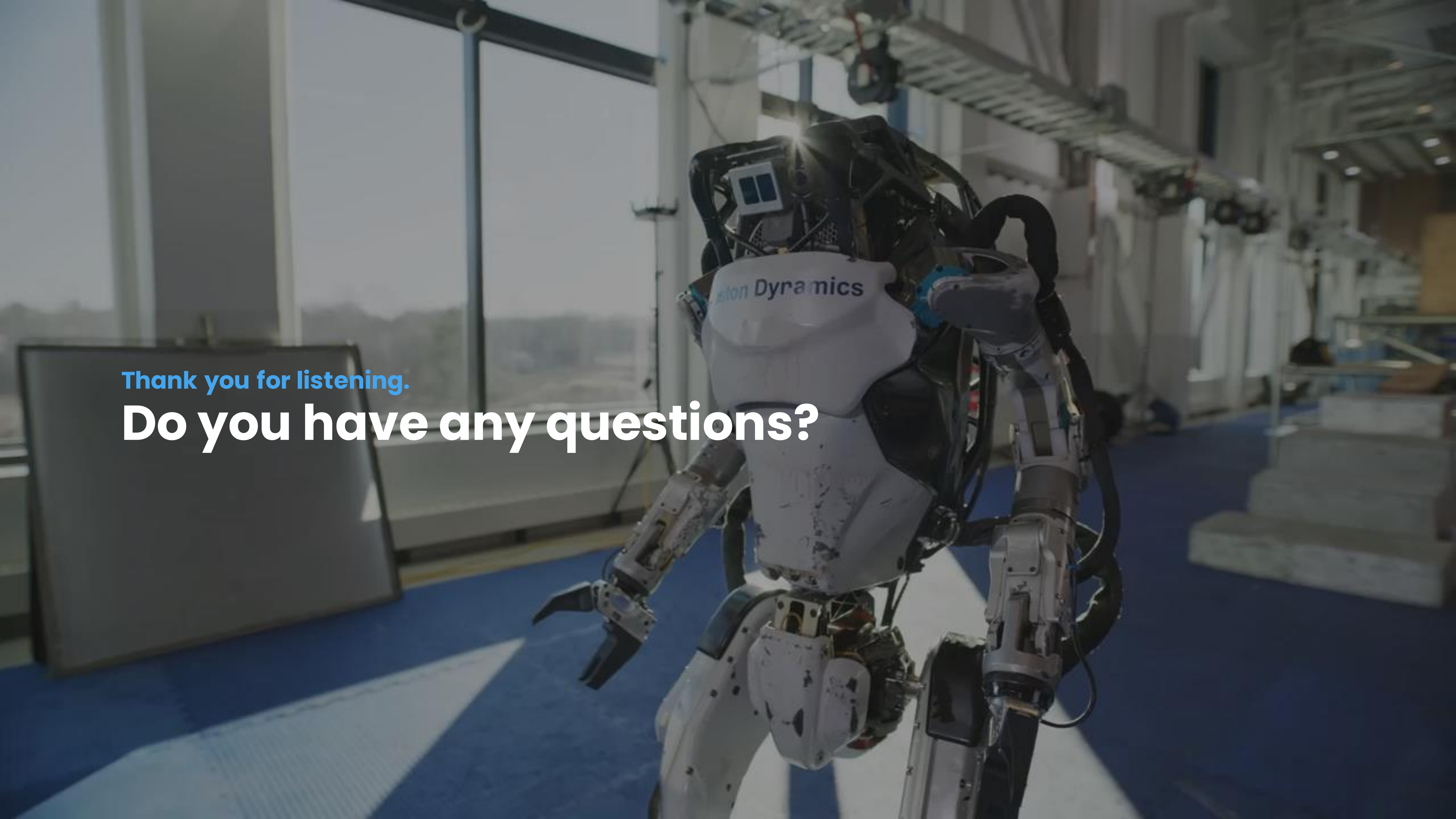
Some technical informations

Short 2 min video


Thank you for listening.
Do you have any questions?