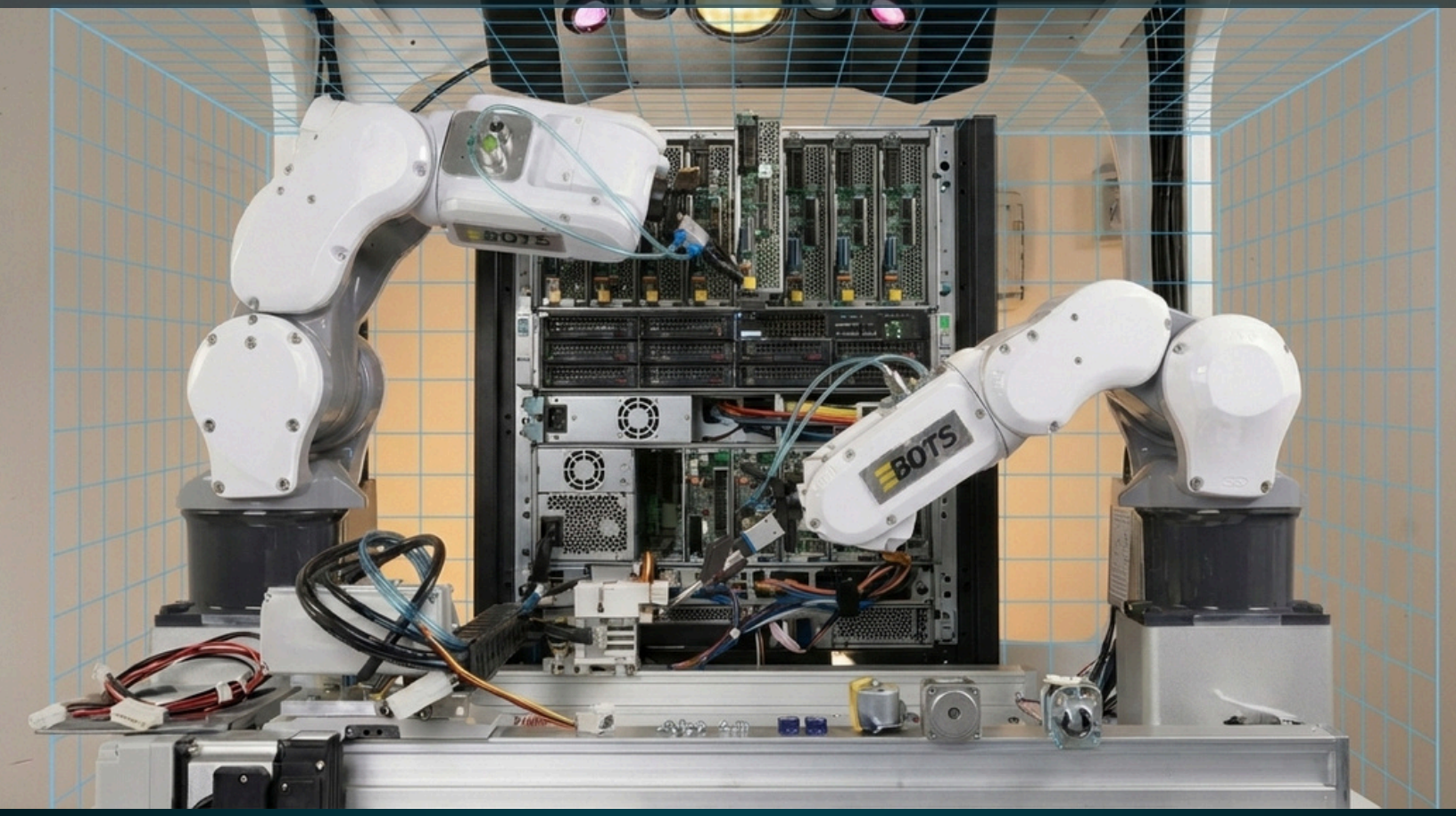
EBOTS

For Cable Manipulation and Wire Harness Assembly

Pinnacle Range X400

Flexible Cable Automation at Large-Area Scale



The Challenge

- Flexible cables that deform, tangle, and resist automation
- Large work areas that exceed fixed robot reach envelopes
- Blind-mate connector insertion in constrained rack environments
- Multi-pin harness routing across complex geometries
- High-voltage cable assembly with zero-fault tolerance
- Field installation workflows that require robot mobility
- Data center rack commissioning speed as a competitive constraint

The eBots Solution

- Mobile platform with extended X-Y travel capability
- Dual-arm precision maintained across the full travel envelope
- Force-torque sensing for flexible cable guidance and routing
- Denali-S 1300 maps cable layout and routing geometry
- Denali precision sensor confirms connector alignment and seating
- Adaptive re-routing when cable position shifts mid-operation
- Operates where the work is — rack, module, or panel

Data Centers

Electric Vehicles

Electrical Equipment

Aerospace & Defense

Pinnacle Range X400

Flexible Cable and Wire Harness Automation

The eBots Pinnacle Range X400 solves the problem the automation industry has walked away from for decades: flexible cable and wire harness assembly at production scale, across large work areas, in the environments where the work actually lives.

A mobile platform with extended X-Y travel lets the X400 cover the full geometry of a server rack bay, EV battery module, or electrical panel without repositioning. Dual-arm precision is maintained across the entire travel range. Force-torque sensing integrated with the vision pipeline guides flexible cables through constrained routing paths, aligns multi-pin connectors with guide features, and confirms seating before release. When a cable shifts during routing, the system detects it and adapts. The Denali-S 1300 maps the large-area cable layout; the close-range Denali handles connector-level precision. For data center operators, this means rack-level cable installation without human hands in the bay.

Visual Perception — Wide (Denali-S 1300)

Sensor Type	Binocular 3D Structured Light
Field of View	500 × 300 mm
Depth of Field	98 mm
Working Distance	1,300 mm
Point Cloud Resolution	160 µm
Frame Rate	207.1 fps (8-bit)
Projector Resolution	2716 × 1600
Camera Resolution	3208 × 2200

Visual Perception — Precision (Denali)

Maximum Load	Binocular 3D Structured Light
Degrees of Freedom	51.2 × 28.8 mm
XY Accuracy	8 mm
Z Accuracy	291 mm
Maximum XY Speed	40 µm
Maximum Z Speed	409.2 fps (8-bit)

Robotic Arm System

Configuration Options	Option A / B / C
Rated load	0.3 / 2.4 / 4.2 kg
Maximum Load	0.5 / 4 / 7 kg
Maximum Reach	350 / 550 / 927 mm
Degrees of Freedom	6-axis
Repeatability	±0.02 / ±0.01 / ±0.01 mm
Number of Arms	2 (coordinated)
End Effector	Custom — cable routing + connector insertion

System Specifications

Control Chip	Intel
Operating System	Linux
Connectivity	Ethernet / TCP-IP / EtherCAT
Protocols	ROS 2, Modbus
MES Integration	Supported
Safety	Self-Closed-Loop
HMI	English & Chinese
Power	220V, 4.5 kW
Platform	Mobile — extended X-Y travel

Precision Solutions for high-mix assembly

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