3D-CartGRIP

Gripping system of trolleys for

EffiBOT

3D-CartGRIP

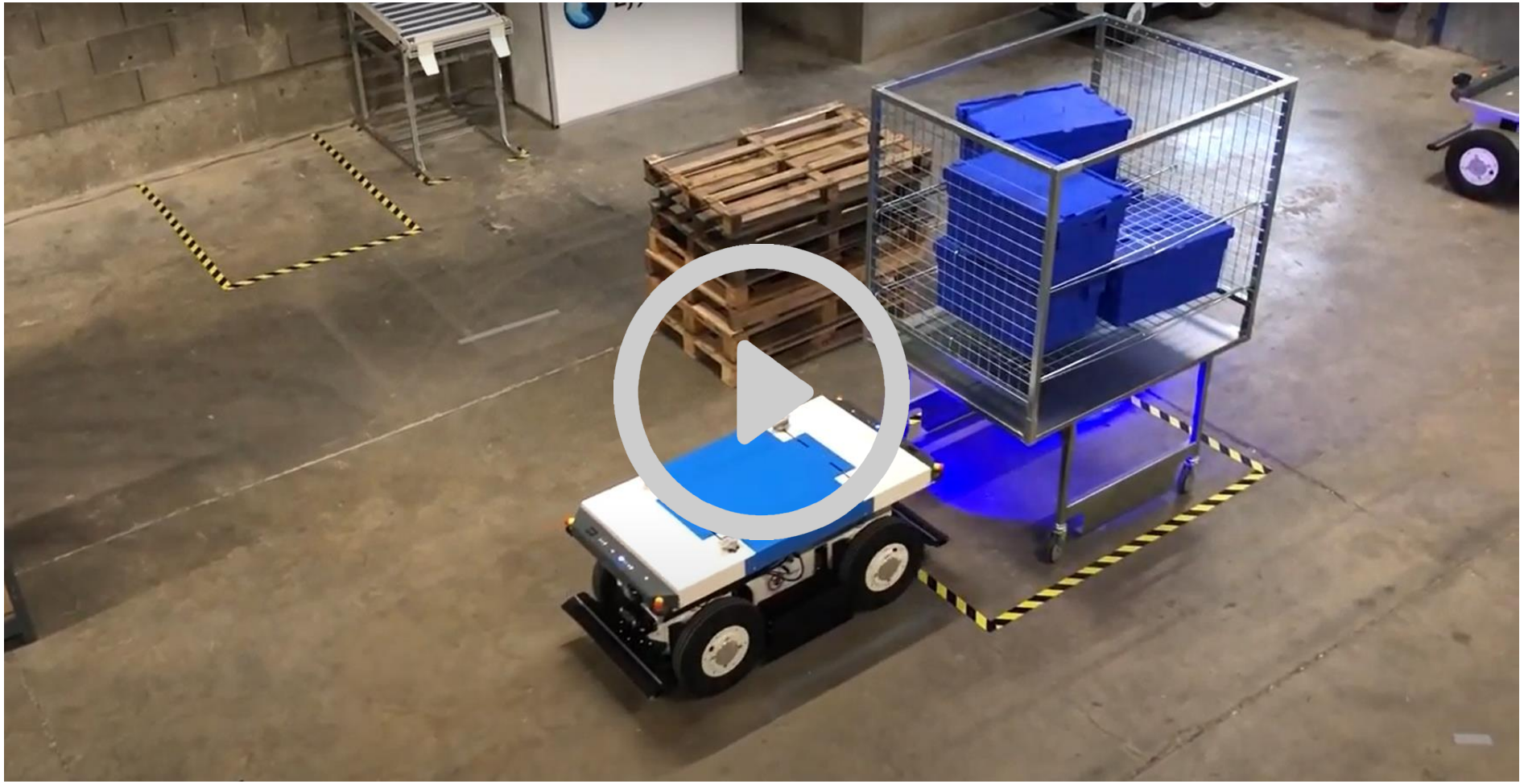
3D-CartGRIP automates the picking and unloading of Effidence **3D-Cart** trolleys, in factories or warehouses, as required.

Thanks to an innovative **3D trolley gripping system**, ensure the transport of a **large volume** of parts **safely** and in **all circumstances**: at high speed, following an emergency stop, on uneven ground.

Benefit from our **Follow-me 360°** collaborative technology, the **EffiBOT** gripped on the truck helps your operators move heavy loads.

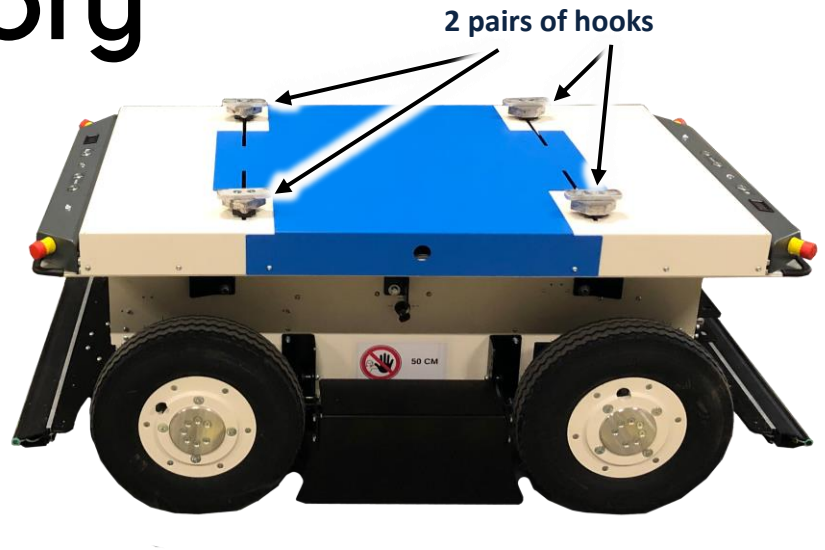
Ensure delivery **anywhere in the warehouse** by navigating close to the operators.

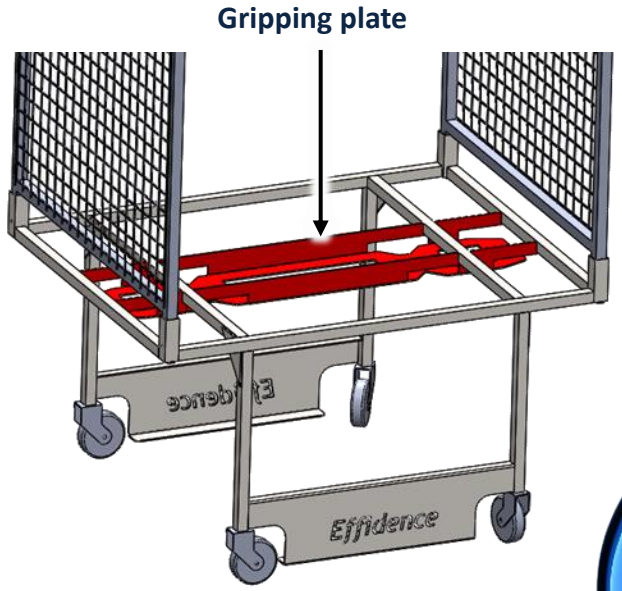
Video



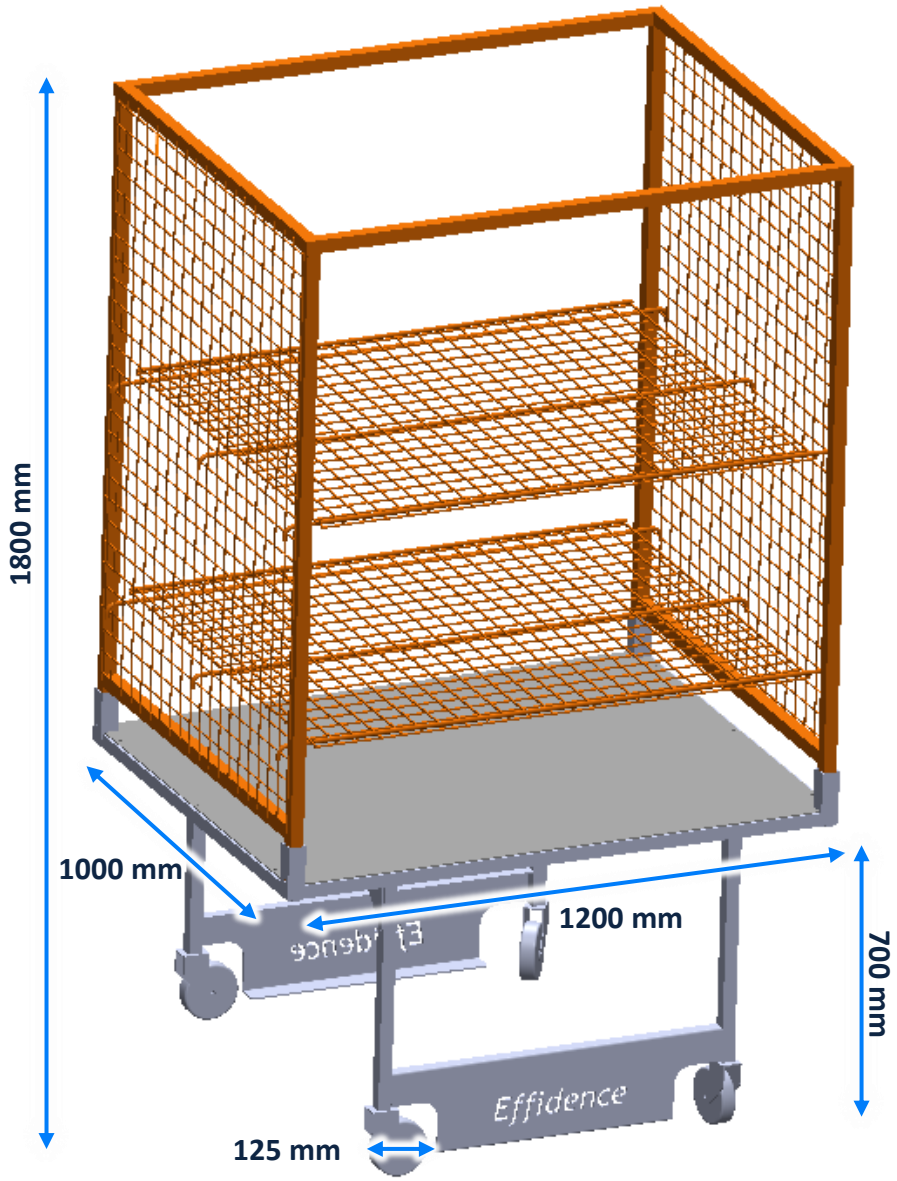
The 3D-CartGRIP accessory

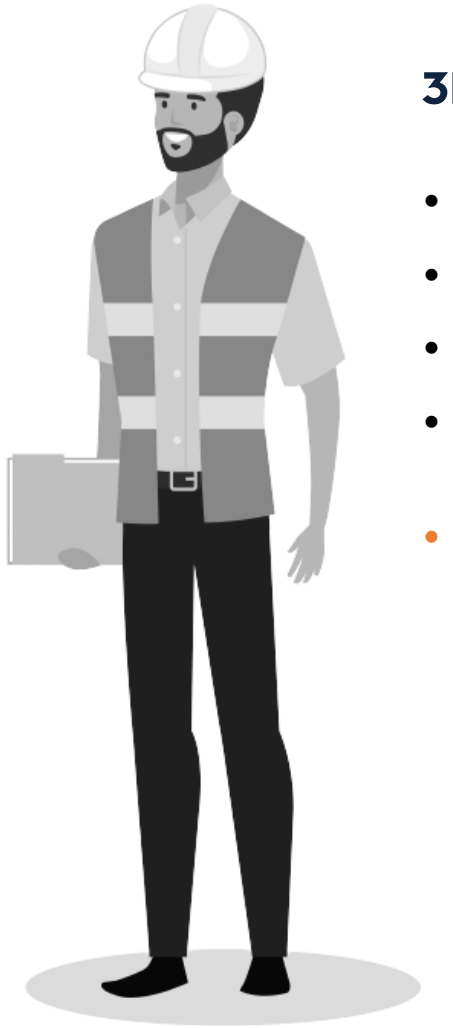
- **3D-CartGRIP** is an accessory that can be attached to the standard **EffiBOT** robot platform. It is composed of 2 pairs of hooks. The **3D-Cart** trolley is equipped with a gripping plate under its first shelf.
- **EffiBOT** goes underneath the trolley and is centred thanks to the 4 feet of the **3D-Cart**.
- **3D-CartGRIP** tightens its **2 pairs of hooks** which ensure the **precise re-centring** of the trolley, and **firmly grips** the gripping plate.
- **EffiBOT** is ready to move, **autonomously or in operator follow-up**.
- To release the trolley, **EffiBOT** loosen its hooks and leave in full autonomy.





The 3D-Cart trolley



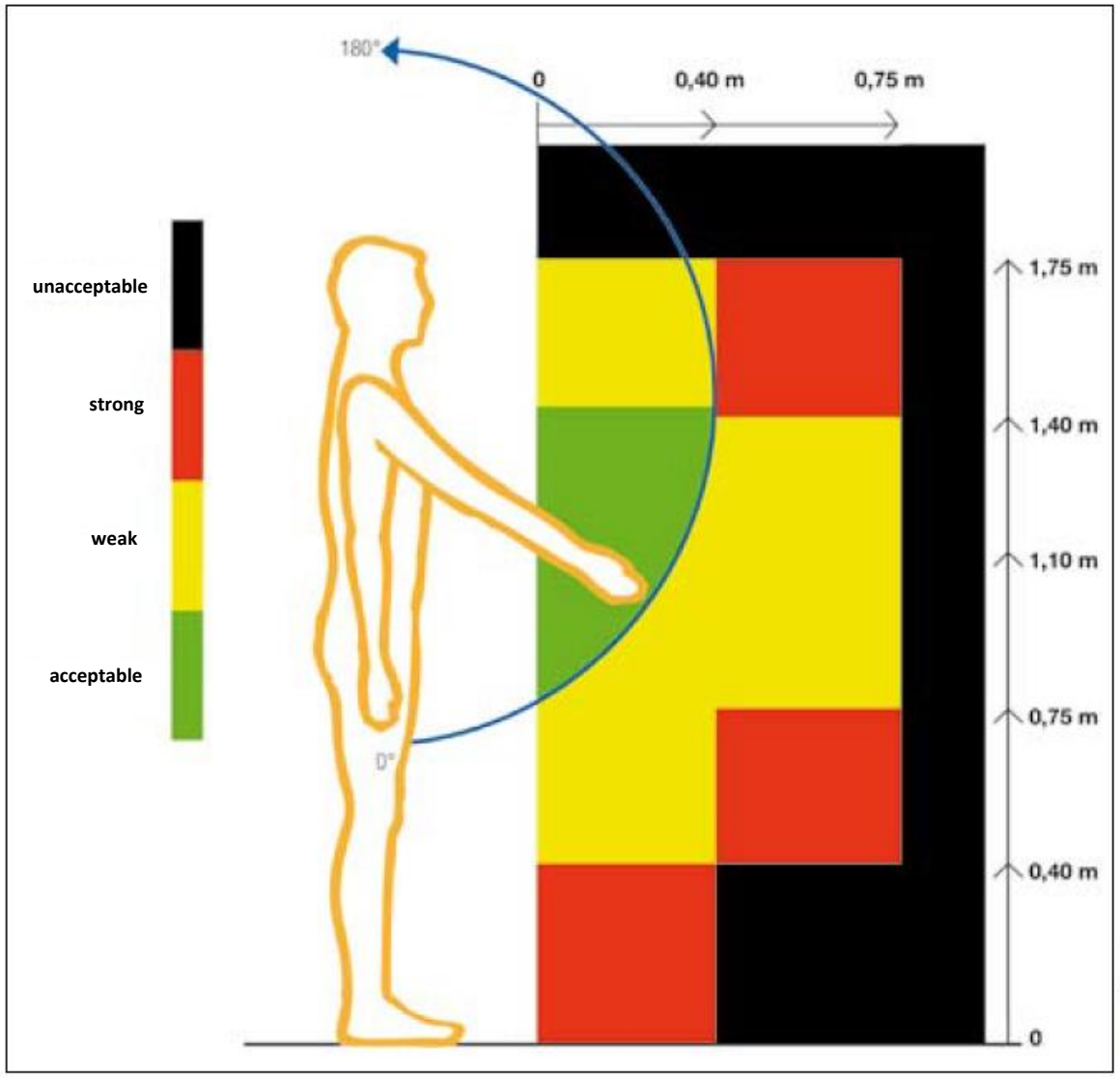


3D-Cart trolley, compatible with the **3D-CartGRIP** :

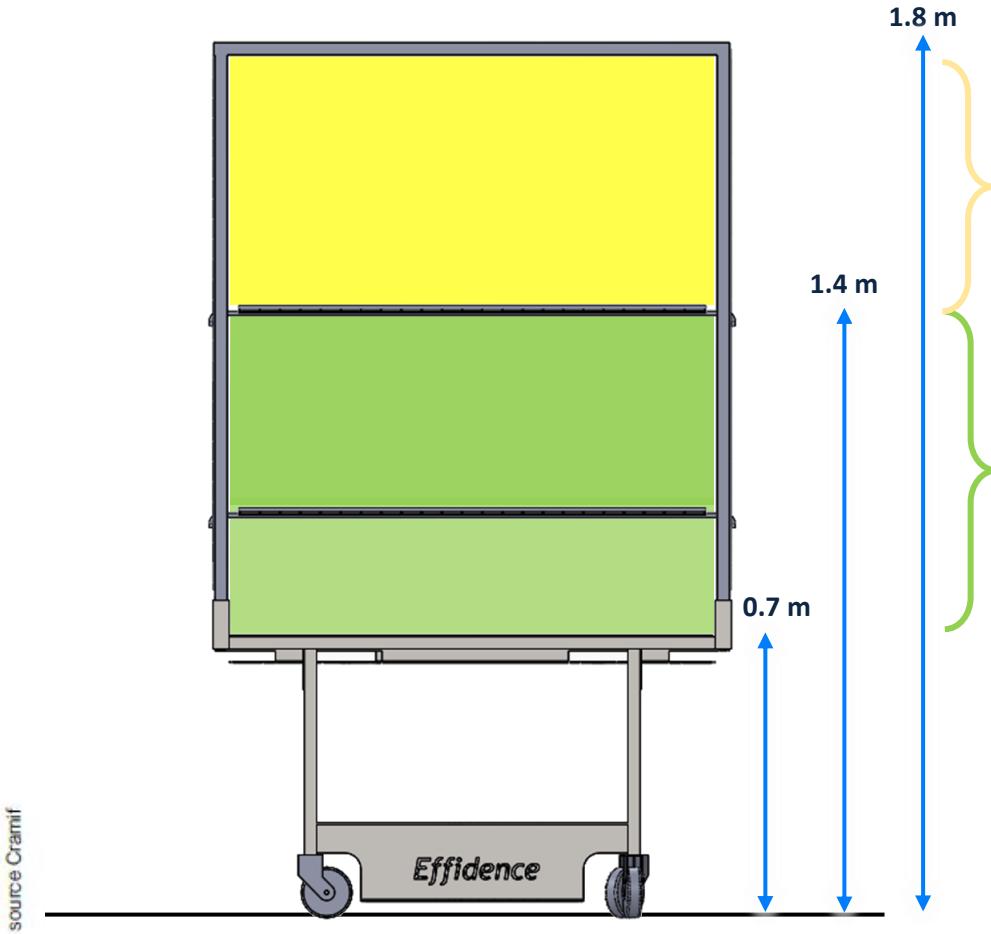
- Loading surface (Lxl) : 1200 mm x 1000 mm
- Loading volume : 1.32 m^3
- Maximum charge : jusqu'à 400 kg
- Trolley's empty weight : 80 kg

- **Equiped with a customizable upper structure**

The 3D-Cart trolley / Working height



Schematisation of the postural constraints' areas for shelving in furniture



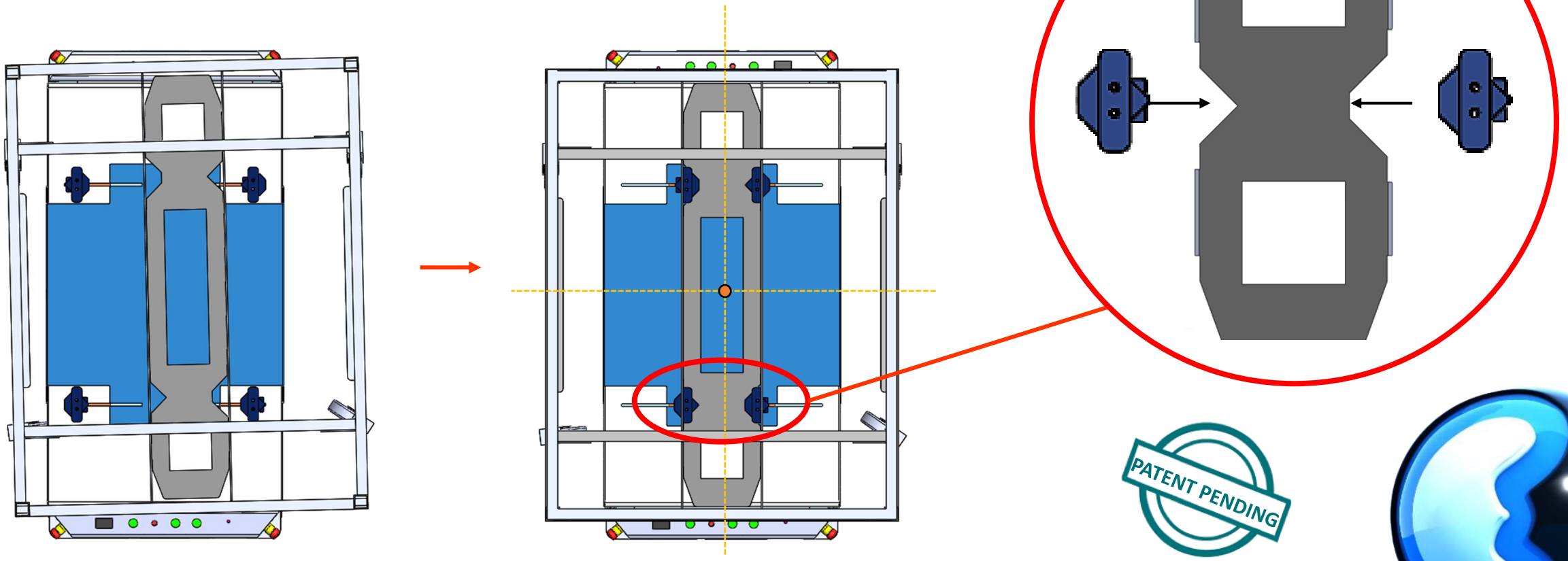
source Cramif

37 % in weak area

63 % in acceptable area

Smart 3D-FootPRINT technology

- **3D-CartGRIP** uses the **Smart 3D-FootPRINT** technology, which provides a unique footprint incorporated into the gripping plate attached to under the **3D-Cart** trolley. Two pairs of hooks of complementary shape to this imprint are present on the **3D-CartGRIP** accessory.



PATENT PENDING

Smart 3D-FootPRINT technology

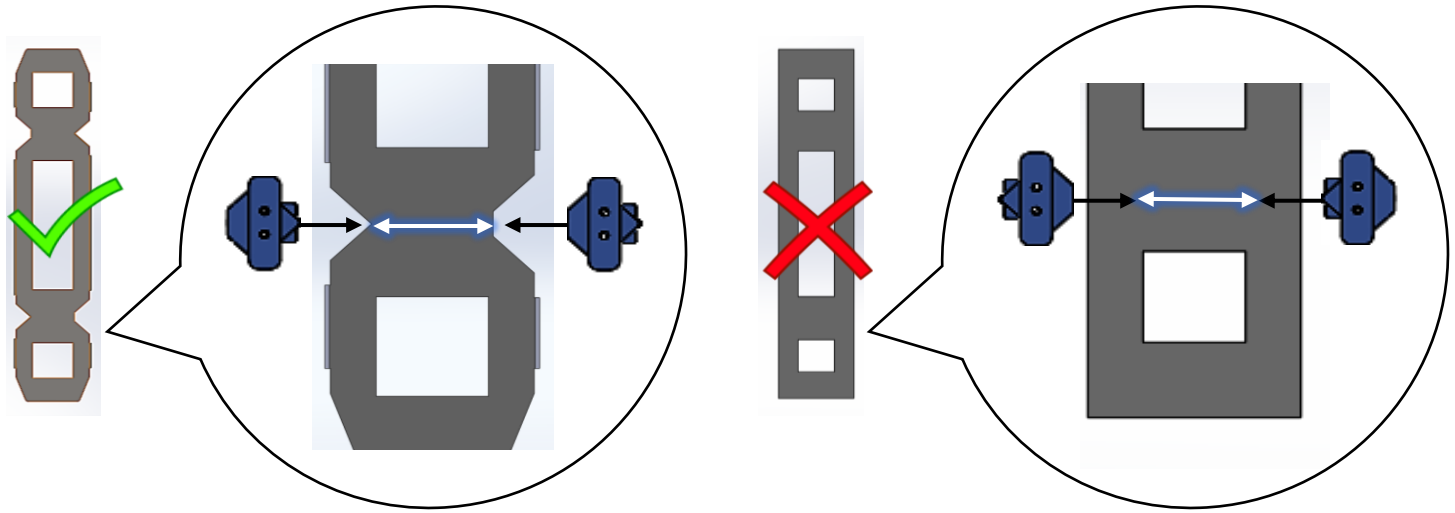
- This **Smart 3D-FootPRINT** technology allows to answer simultaneously the 3 following challenges.

	Smart 3D-FootPRINT
Reliable **3D-Cart** trolley identification	✓
Securising the gripping phase	✓
Securising the gripping of the carriage during robot movement	✓

Smart 3D-FootPRINT technology

Reliable **3D-Cart** trolley identification

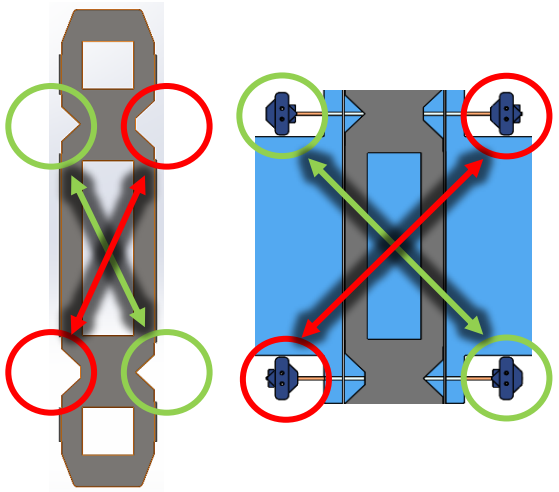
- After closing the pairs of hooks on the gripping plate, the distance between the two hooks makes it possible to uniquely and reliably identify the **3D-Cart** trolley.



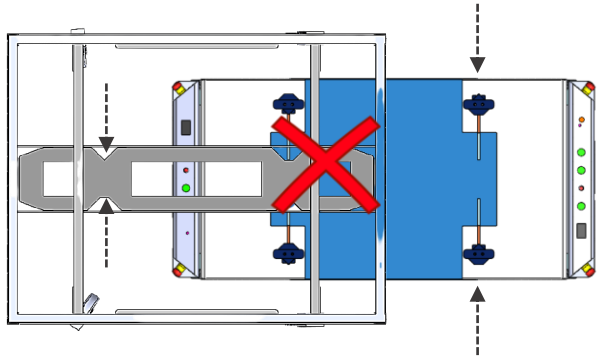
Smart 3D-FootPRINT technology

Securising the gripping phase

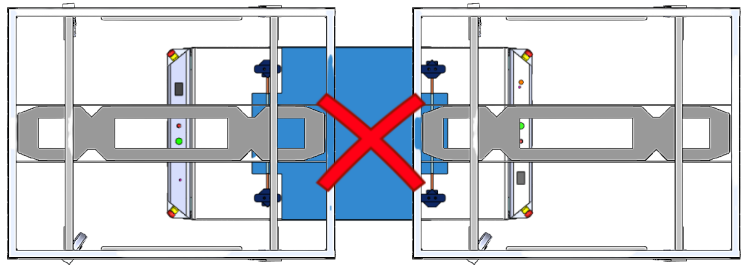
- The footprints integrated in the gripping plate prevent improper gripping. They do, however, allow gripping from the front or rear of the 3D-Cart and in forward or reverse gear of **EffiBOT**.



Footprint symmetry



Non-conform gripping detected
(e.g. the operator moves the trolley).

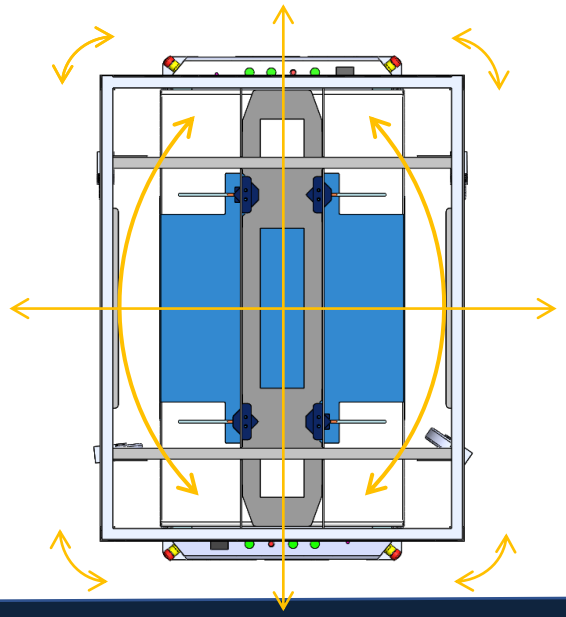


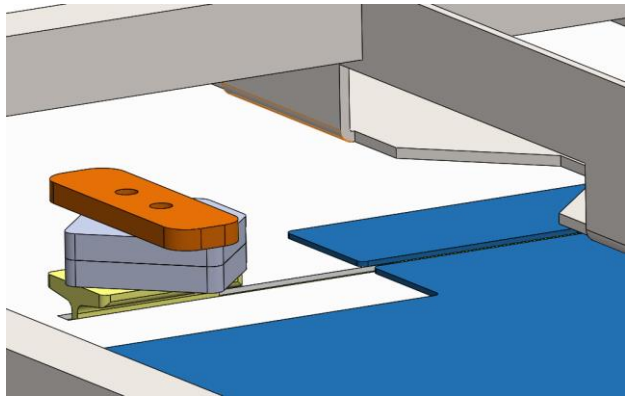
Non-conform gripping detected
(e.g.: trolleys in single file)

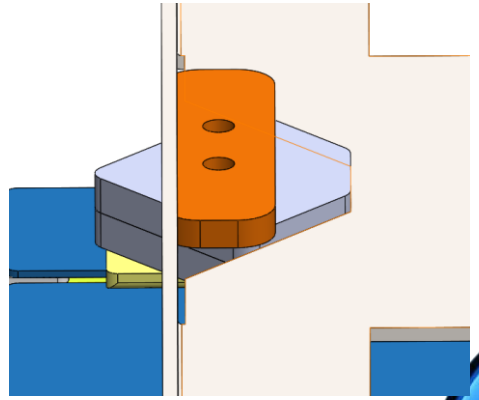
Smart 3D-FootPRINT technology

Securising the gripping of the carriage during robot movement

- Closing the two pairs of hooks on the gripping plate centres 1-laterally, 2-longitudinally, and 3-angularly the **3D-Cart** on the **EffiBOT**. These hooks also ensure a firm hold, even in the vertical (3D) position of the trolley.







3D support: vertical. The hook consists of an upper plate that prevents the trolley from moving vertically.

Usage

- 3D-CartGRIP can be used **with** or **without** a **float server.**

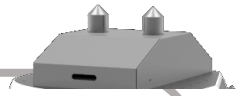
- Without server : **" standalone mode ",** EffiBOT moves in total autonomy according to the indications given in its cartography:
    - Road list,
    - navigation destination defined by zones and activated either by pressing the "Auto" button on the keypad or triggered by a timer.

- With a **"FCS mode"** server, EffiBOT moves in total autonomy according to the instructions communicated in Wifi by the server. Eventually, these instructions can come from the cartography.

- If EffiBOT reaches a deposit destination, it will open its hooks when it reaches its destination.

- If EffiBOT reaches a pickup destination, it will attempt to locate the 3D-Cart as it approaches the destination. This recognition is based on detecting at least 3 feet from the trolley (checking the width of the feet and their spacing). If no cart is present, EffiBOT will park at the destination. If a 3D-Cart is recognised, EffiBOT will position itself in the centre of the cart and close its hooks.

Synthesis



	Other products	3D-CartGRIP
Useful volume	~0.50 m³ *(a)* 0.63 m³ *(b)* 0.87 m³ *(c)*	**1.32 m³**
Useful charge – Speed	68 kg – 1.5 m/s *(a)* 130 kg – 0.9 m/s *(b)* 270 kg – 1.2 m/s *(c)*	**200 kg - 2m/s**
Controlled emergency trajectory	4 idle wheels Robot mass < 100kg	**4 steering wheels, braked** **Robot mass 140kg**
Reliable identification of the **3D-Cart**	✗	✓
Securising the gripping phase	✗	✓ SIL2 Functional Safety PLd
Securising of the trolley's suspension system	✗	✓ SIL2 Functional Safety PLd
Follow-me 360° function	✗	✓

(a) Fetch CartConnect, (b) Omron CartTransporter, (c)MIR Shelf Carrier

Effidence

Intelligence for mobile robotics

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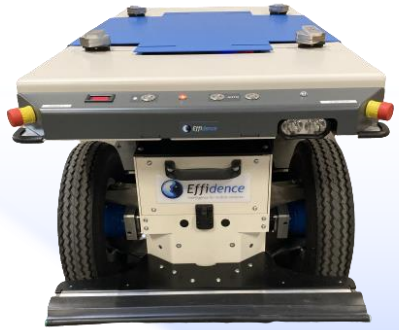

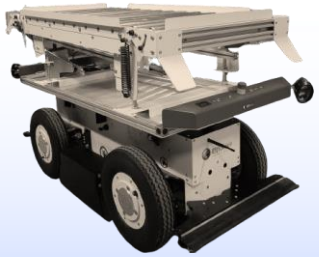

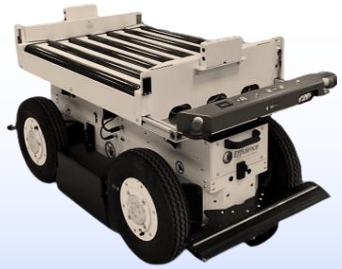

3D-CartGRIP