

LINEAR MOTION



Material Handling for Heavy Load Applications

Mechanical Solutions for a Quick Success

Speaker: Dipl.Ing. Ulrich Gimpel

NTN Corporation

NTN: New Technology Network



4,9*
Billion €



25 000*
Employees

brands:

NTN



BCA
BEARINGS by NTN

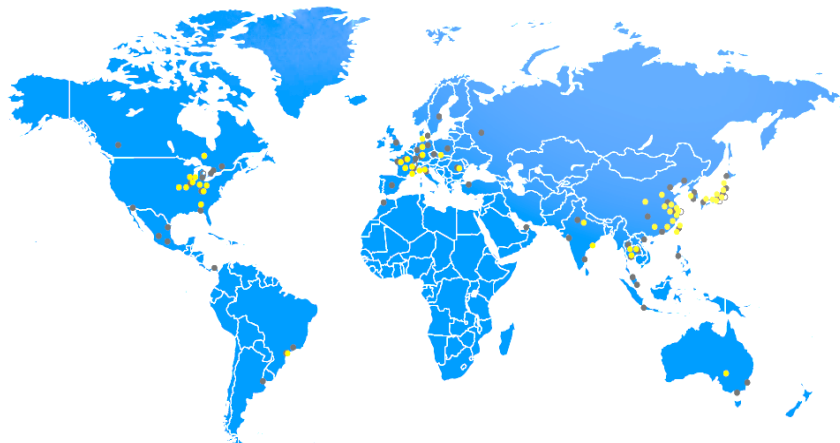
BOWER
HEAVY DUTY BEARINGS by NTN



NTN CEO

Eiichi UKAI

*Business year 2021 – 01.04.20/31.03.21 – Exchange rate: 1 Euro= 125 Yen



73
Production facilities

118
Sales offices

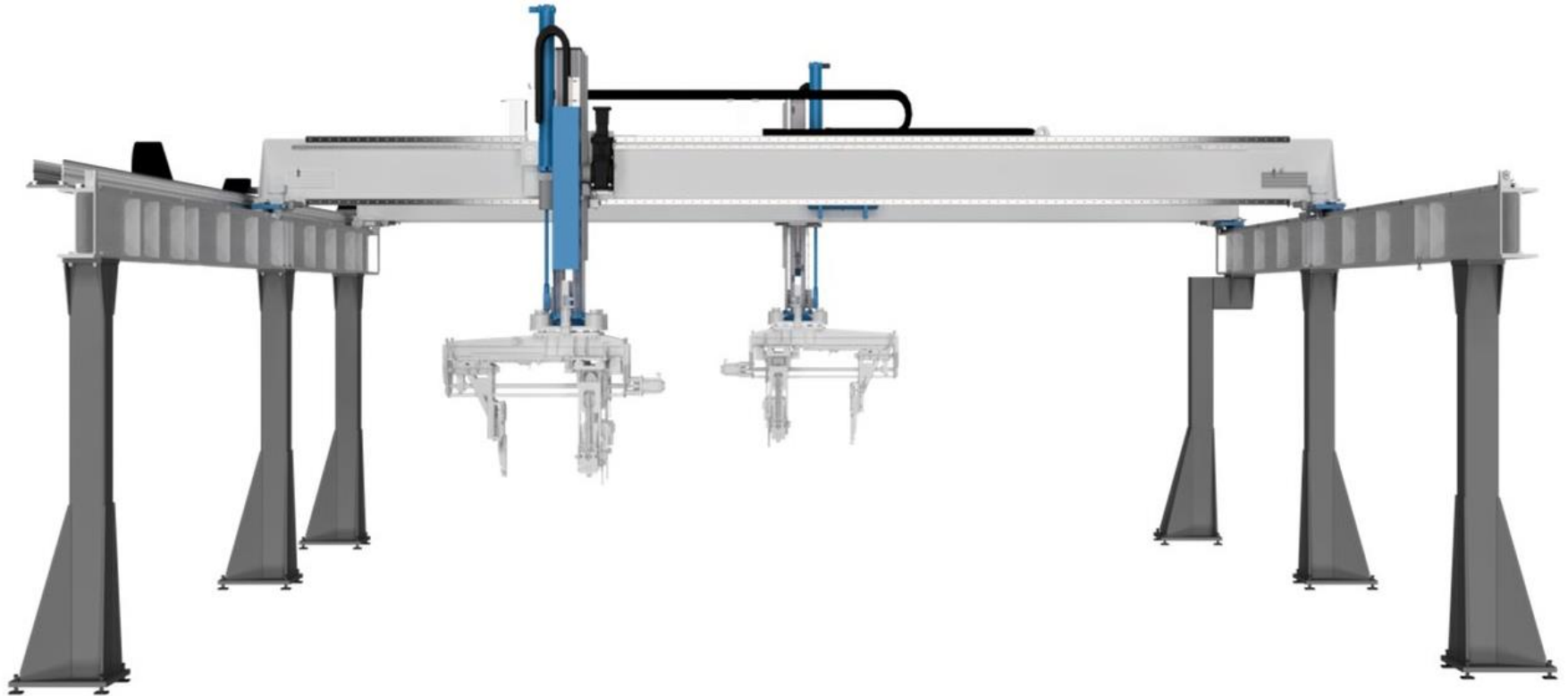
Bearings, mounted units, **linear technology**,
sensor bearings, constant velocity joints,
tool and service solutions, maintenance products

NTN is one of the pioneers in Linear Motion **AXIS** business: Activ since 1989

All Linear Motion activities are concentrated in Bielefeld / Germany for the entire company

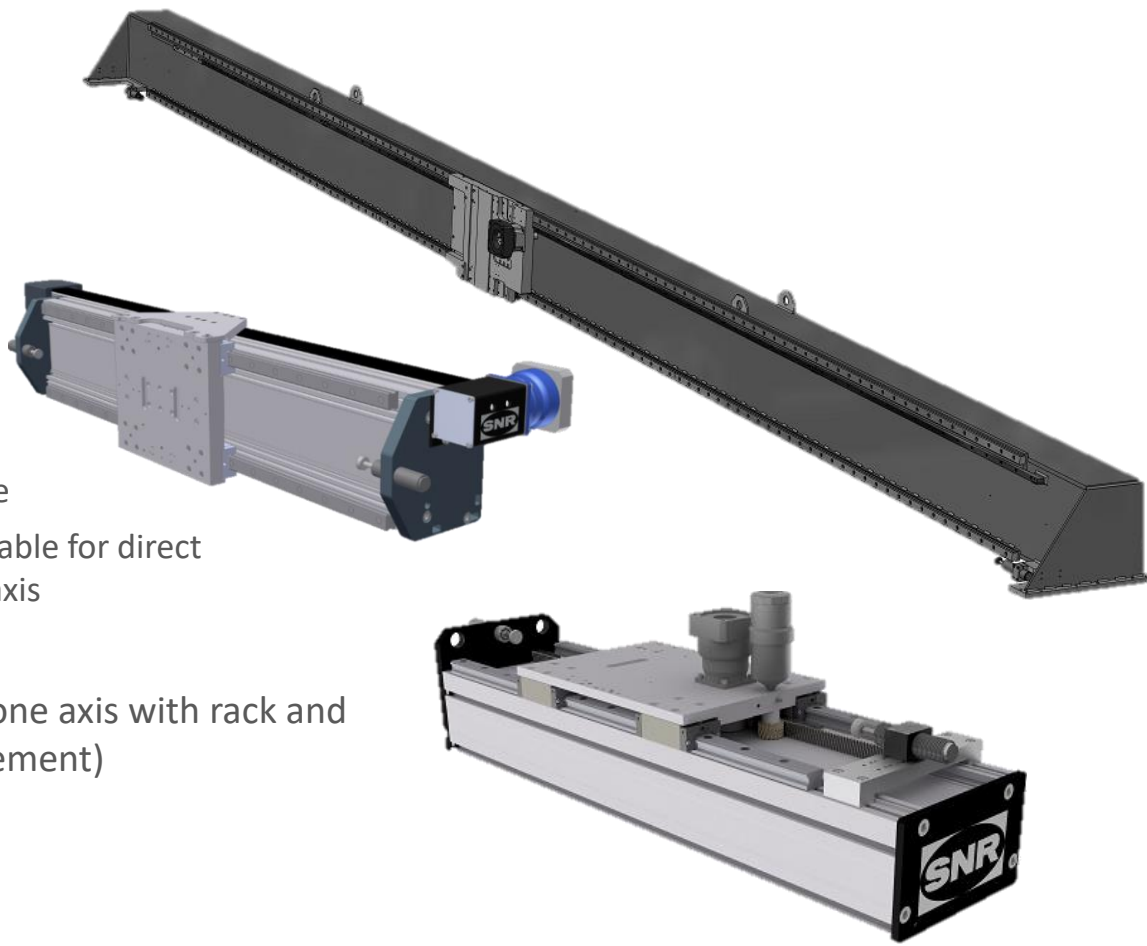
Heavy load applications

- Inside industrial automation processes the number of heavy load applications is increasing continuously.
 - Portal- and Cartesian Robots for moving and handling of heavy goods
 - High efficiency, high accuracy and high dynamics are the market requests
- Just a few companies are specialized and provide mechanical solutions for handling weights **higher 100kg** up to several **tons**.
- **Application know how** and a **wide repertoire** of solutions is the **key for success**



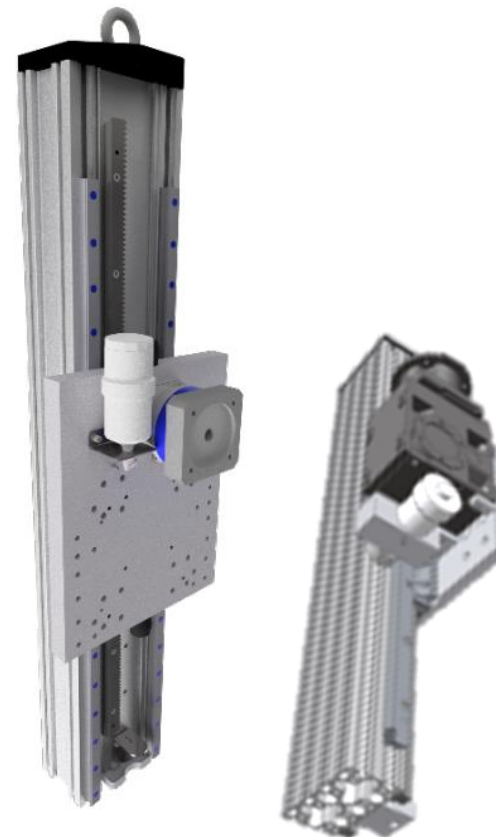
Gantry axis

- **Aluminum or steel** profiles as base
- 2 Drive versions
 - ✓ Toothed belt
 - ✓ Rack and pinion
- 1 Guiding system
 - ✓ Two linear guides parallel with top table
 - ✓ Two linear guides parallel without top table for direct combination with Lifting or Telescopic axis
- Length up to 12m (one-segment)
- Assembling from several slider units on one axis with rack and pinion drive possible (independent movement)



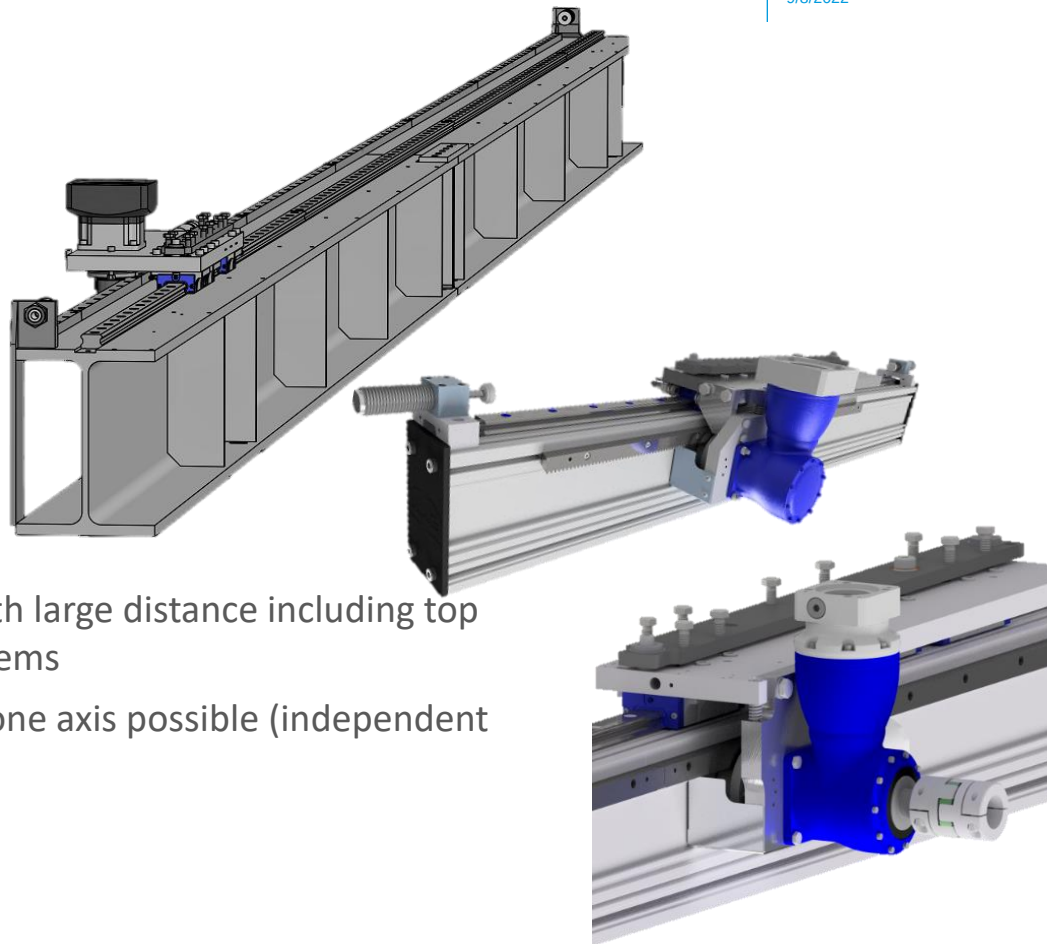
Lifting axis

- Aluminum profile as base (special versions with **steel** profiles)
- 1 Drive version
 - ✓ Rack and pinion
- 1 Guiding system
 - ✓ Two linear guides parallel with top table
- Vertical handling in line and area portals
- For high dynamic operating power, masses over 2.000 kg possible



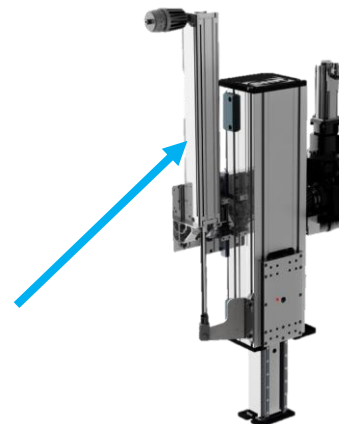
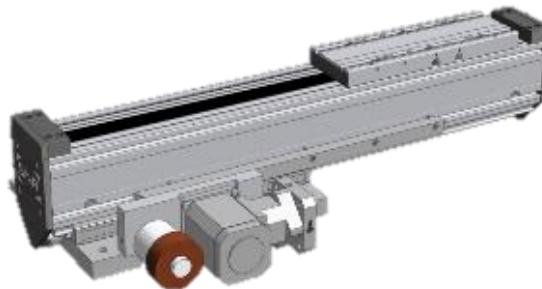
Beam axis

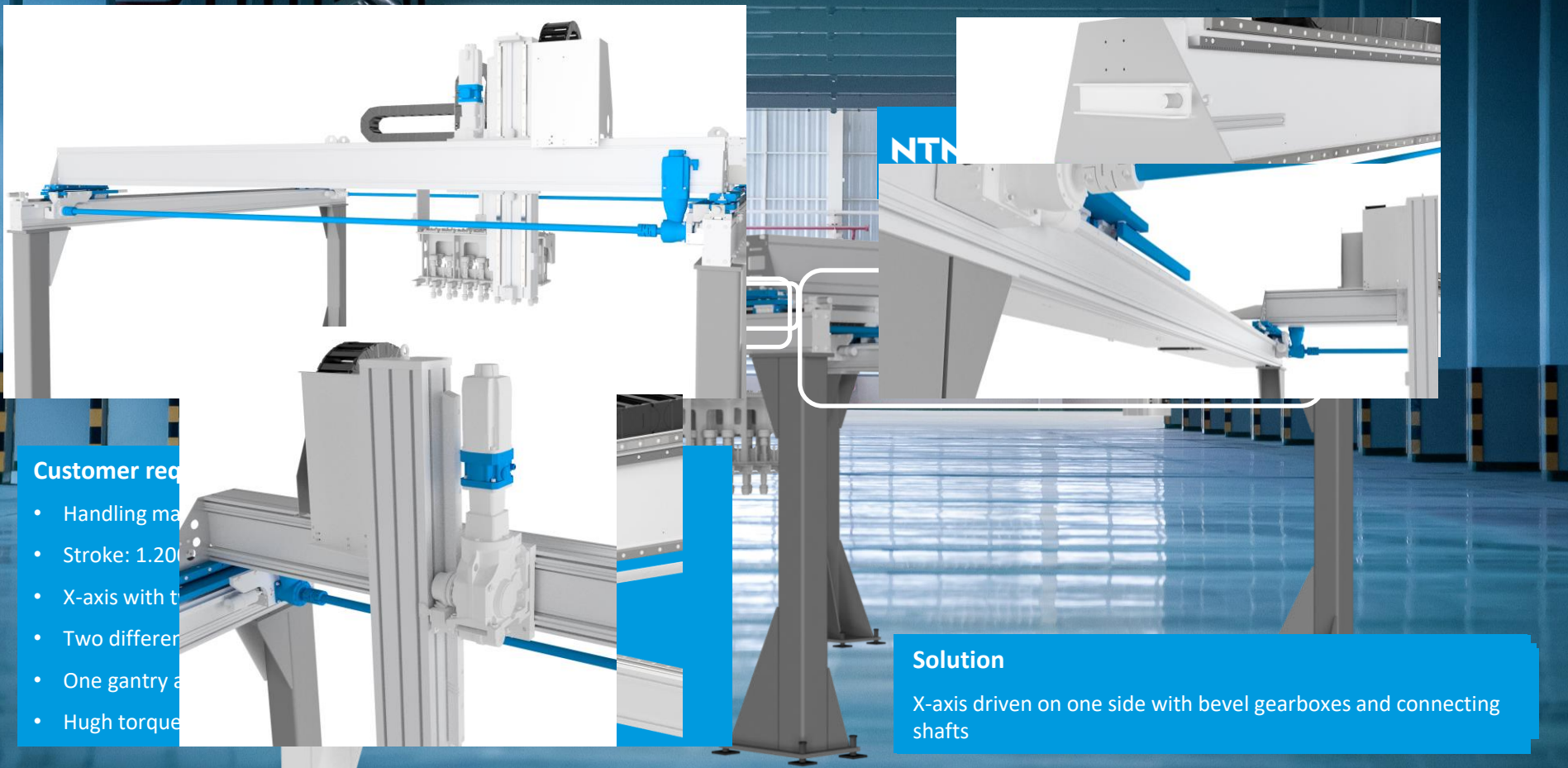
- **Aluminum** or **steel** profiles as base
- 1 Drive version
 - ✓ Rack and pinion
- 1 Guiding system
 - ✓ One linear guide with top table
- Length up to 12m (one-segment)
- For the use as two parallel Beam Axis with large distance including top tables with tolerance compensation systems
- Assembling from several slider units on one axis possible (independent movement)



Telescopic axis

- Aluminum profile as base
- 2 Drive version
 - ✓ Toothed belt/ Ω drive combined with toothed belt drive
 - ✓ Rack and pinion drive combined toothed belt drive
- 1 Guiding system
 - ✓ Two linear guides parallel
- For the use with limited installation space
- Horizontal and vertical use possible
- High velocity up to **10 m/s**
- Optional counterbalance cylinder for high loads possible



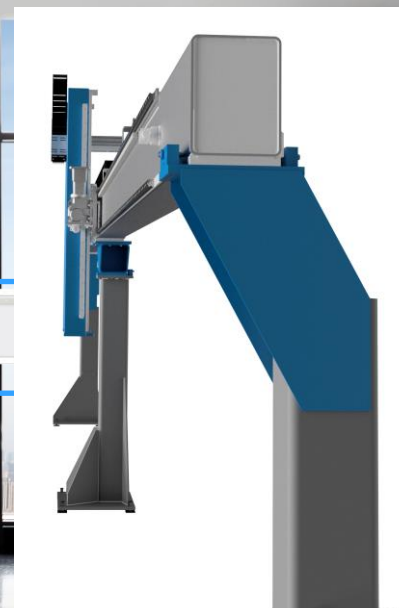
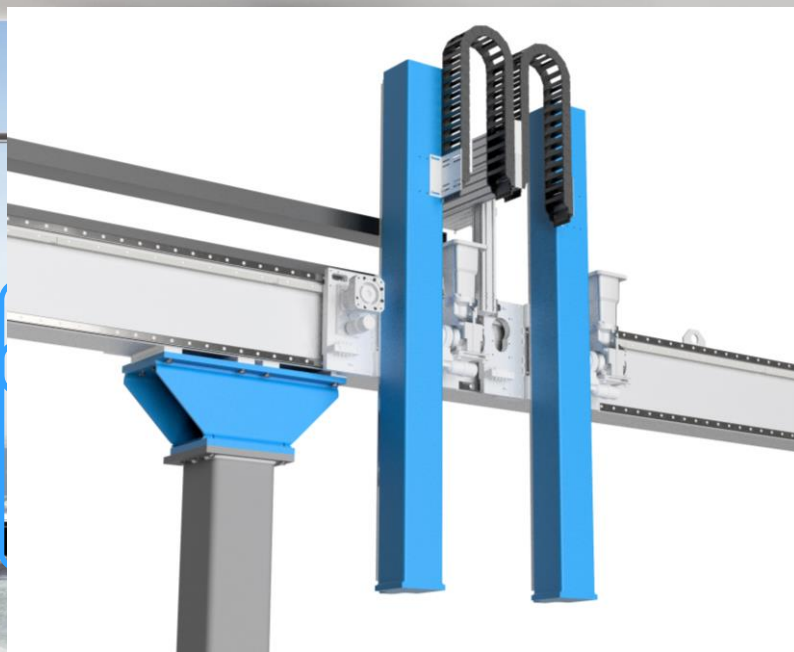


Customer requirements

- Handling material
- Stroke: 1.20m
- X-axis with t
- Two different
- One gantry a
- High torque

Solution

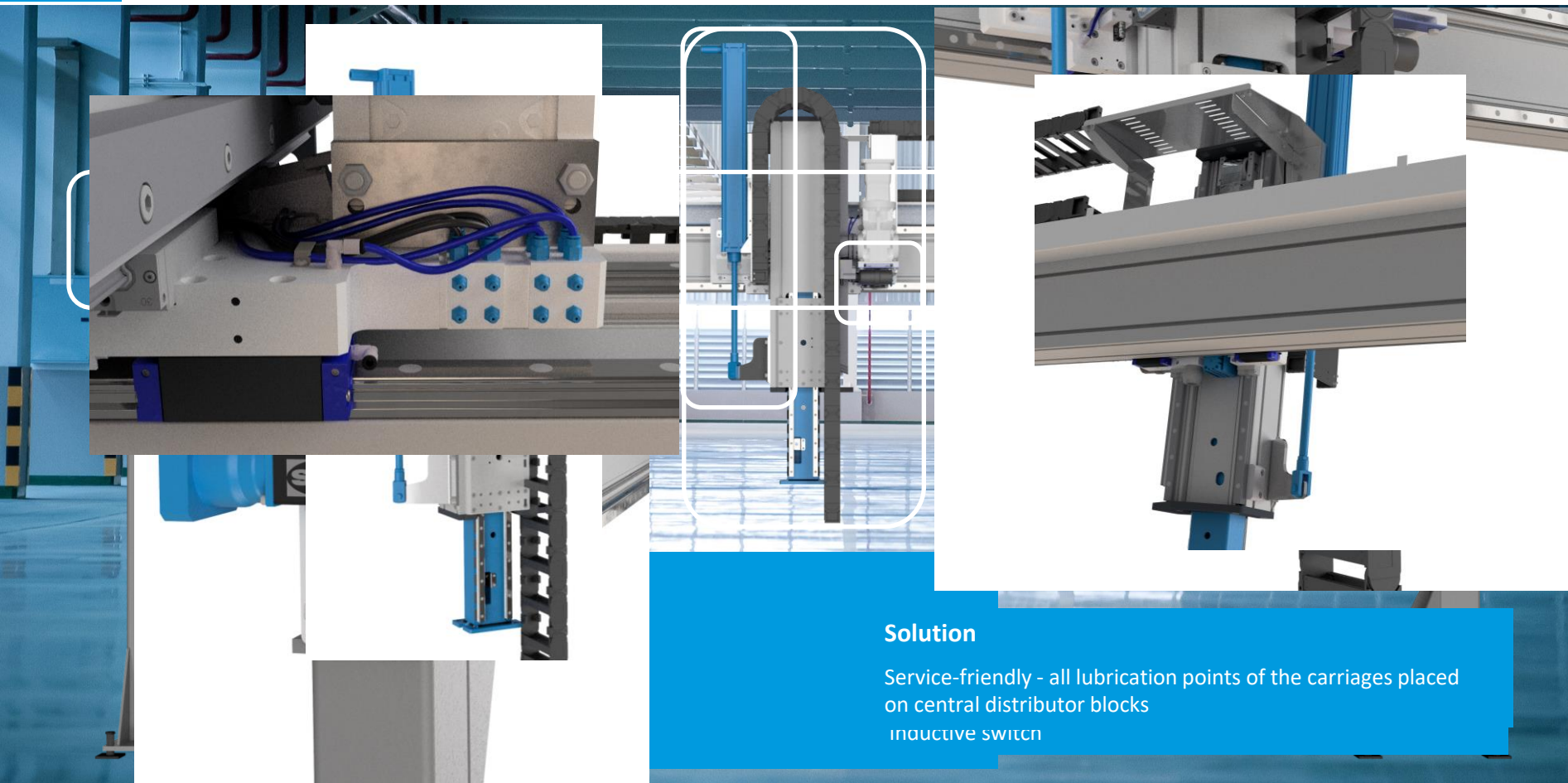
X-axis driven on one side with bevel gearboxes and connecting shafts



- Velocity: app. 1,5m/s
- Acceleration: 2,5m/s²
- Environmental conditions: 0° C up to +45° C
- $\Delta T = 22^\circ \text{ C}$ within 24 hours
- Dusty environment

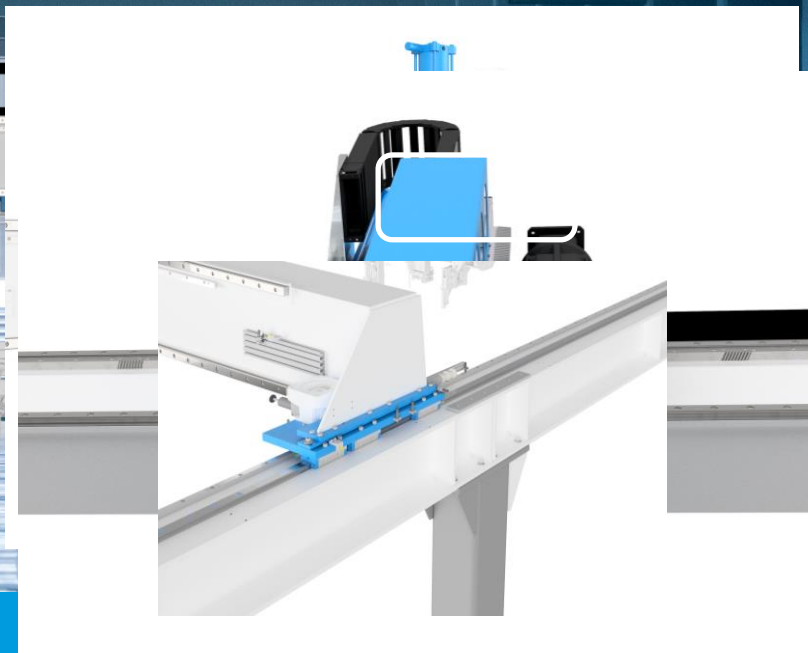
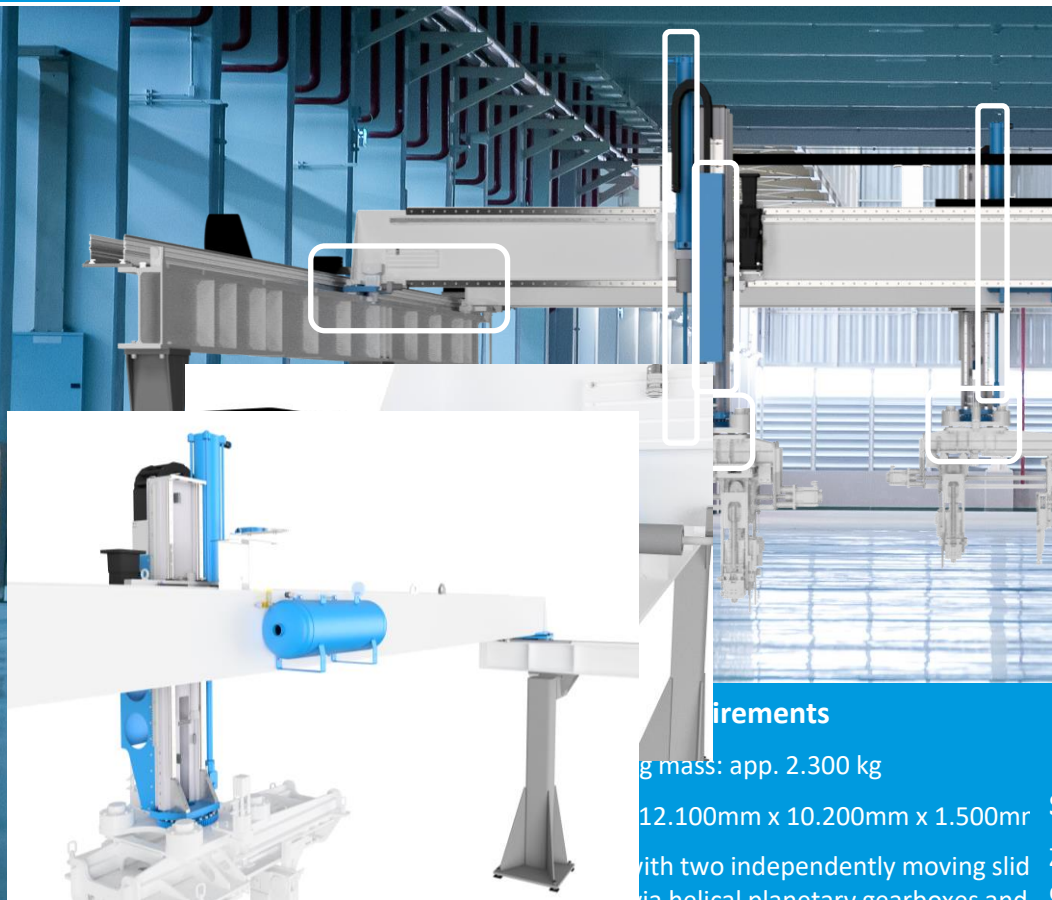
Solution

Double-Z-axis made of steel to avoid bending due to temperature differences
legs designed as fixed bearing



Solution

Service-friendly - all lubrication points of the carriages placed on central distributor blocks
inductive switch



Requirements

g mass: app. 2.300 kg

12.100mm x 10.200mm x 1.500mr

with two independently moving slid
driven via helical planetary gearboxes and

Solution

Z-axis with pneumatic load compensation incl. compressed air
compensation tank at the Z-axis

- Strong growing field of applications with higher demands: **Automation** is the key to solve the lack of skilled manpower
- A wide number of **combinations out of technical solutions** and know how is essential to follow these demands
- Long lifetime under severe conditions need the **latest technology** in mechanical- and lubrication sectors

Thanks for your attention!

Danke für Ihre Aufmerksamkeit!

ご清聴ありがとうございました!