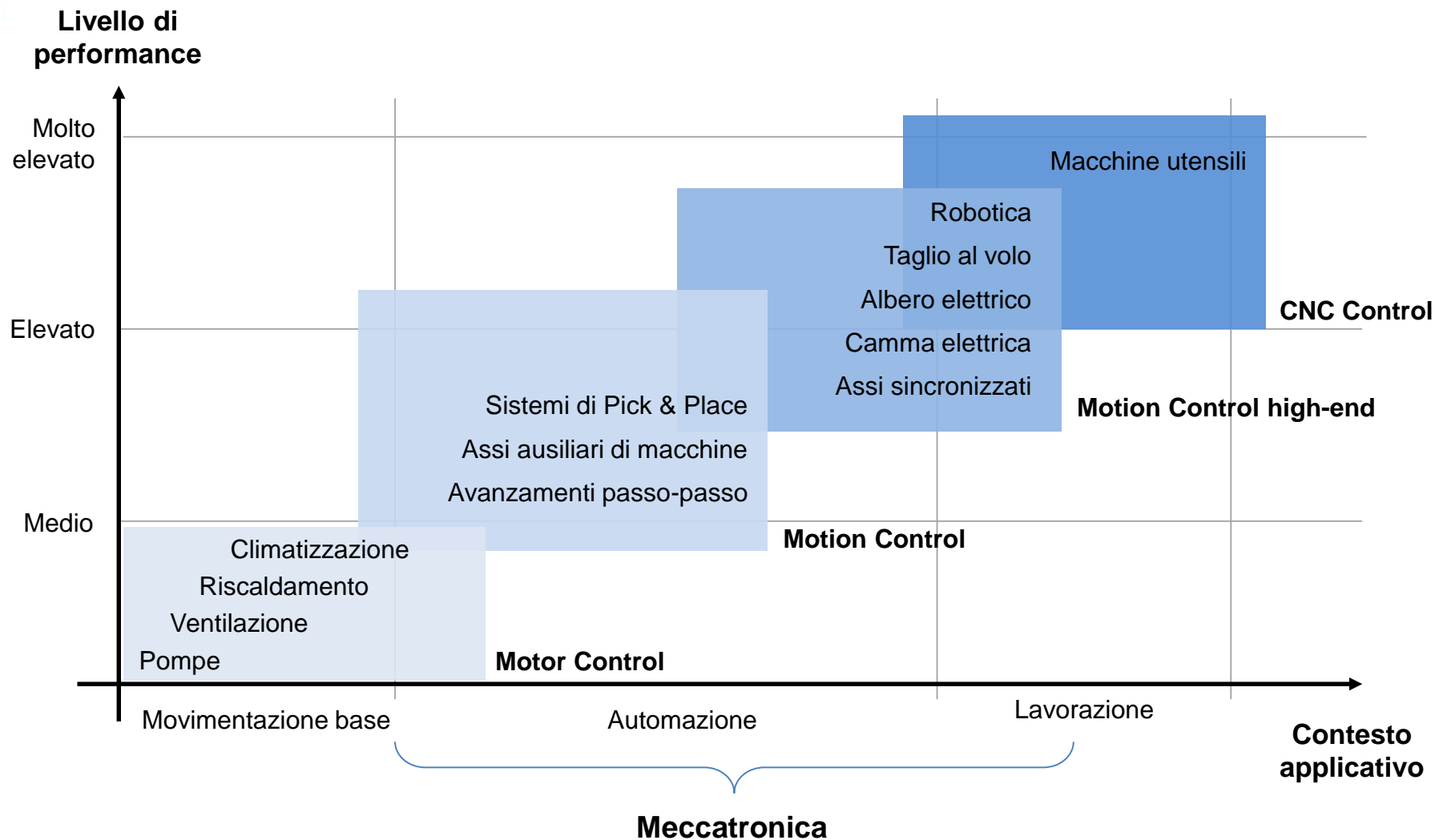


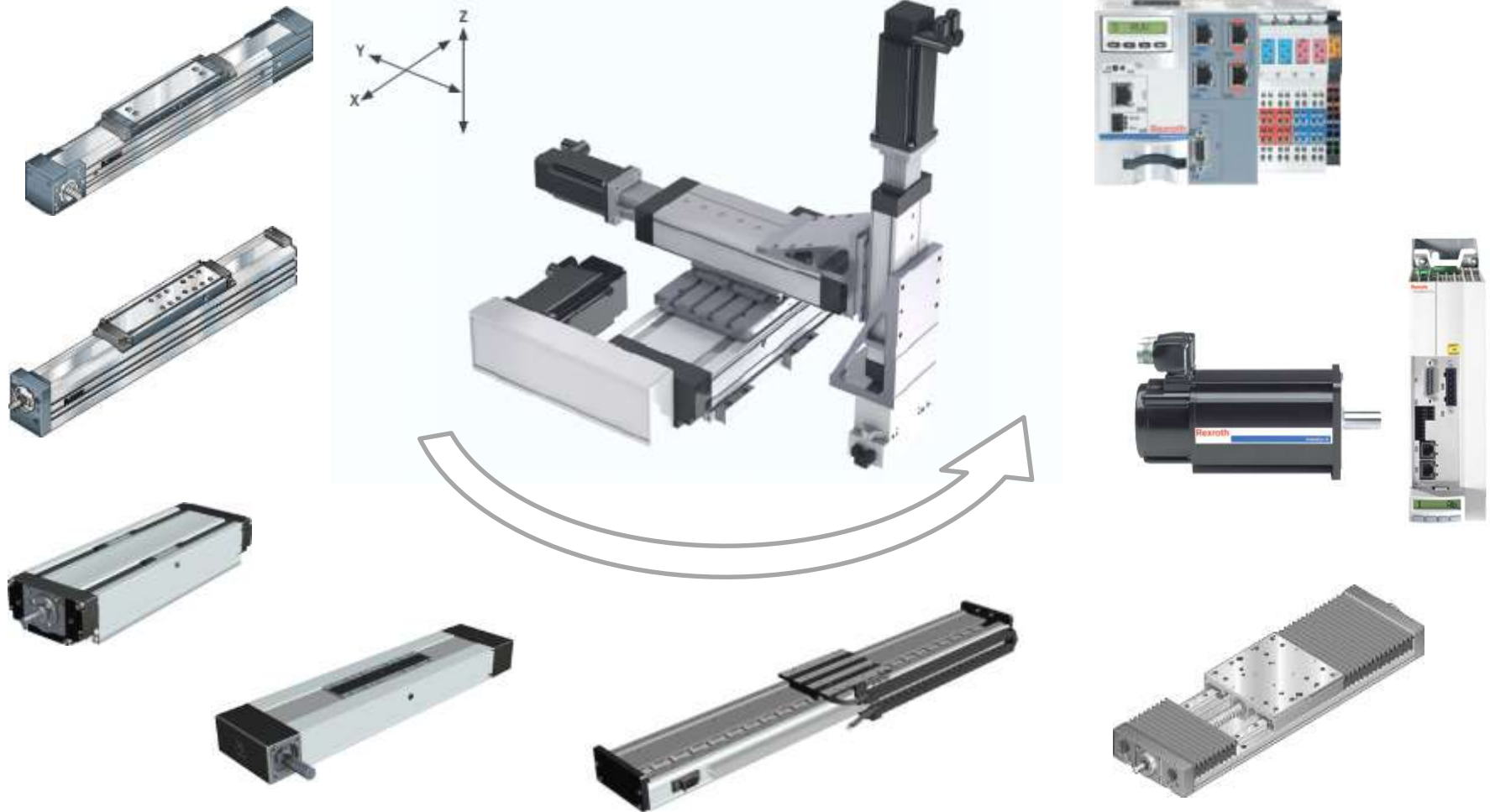
**Progettazione meccanica:  
dalla scelta dei componenti di base alla  
realizzazione del sistema cartesiano completo**

Andrea Piatti  
Bosch Rexroth S.p.A.

# Meccatronica



# Sistemi Lineari Meccatronici

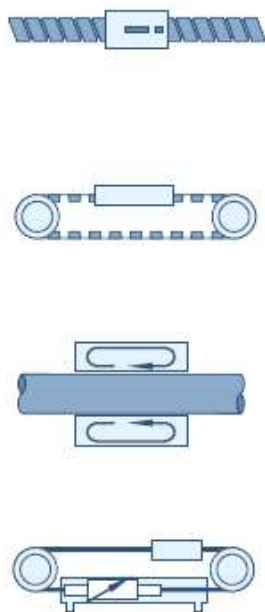


# Costruzione dei Sistemi Meccatronici

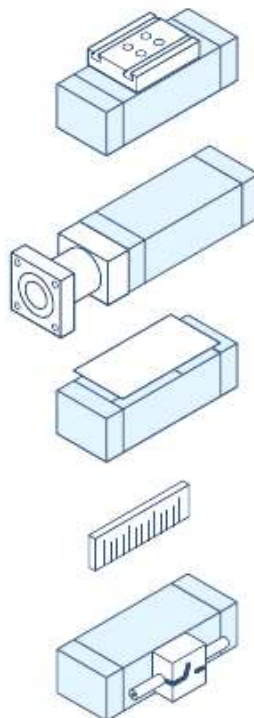
**Sistema di guida**



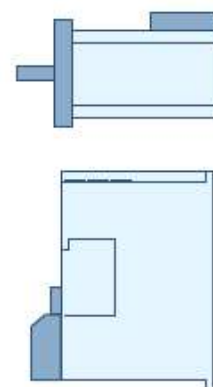
**Sistema di azionamento**



**Struttura ed accessori**



**Motori ed azionamenti**

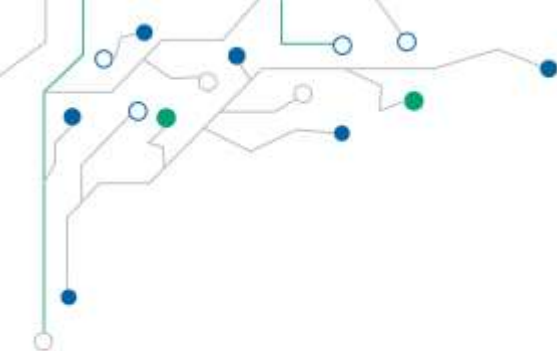


**PLC/Motion**



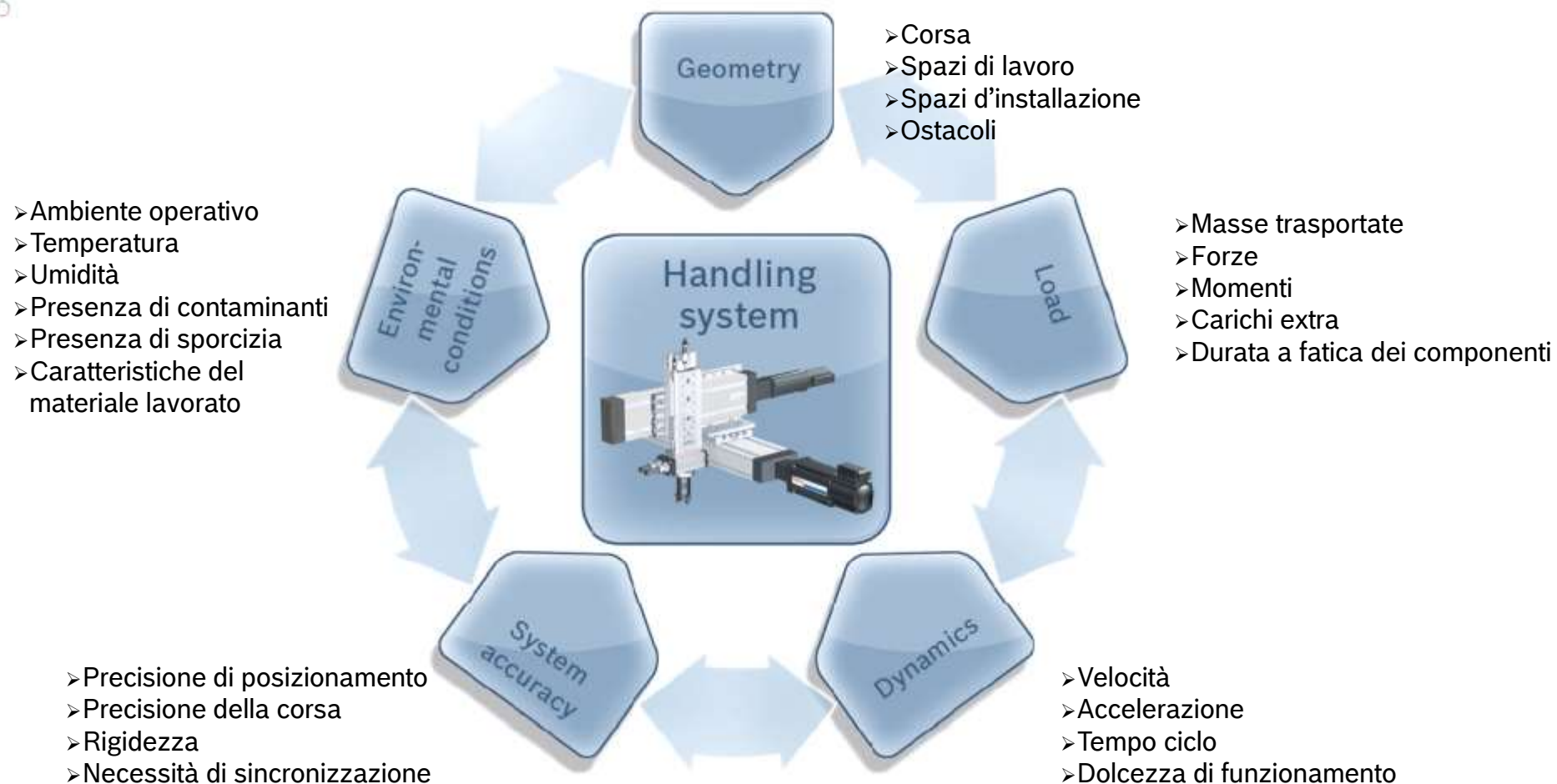
**Sistema Lineare**





# Come si progetta un Sistema Meccatronico

# I parametri di progettazione

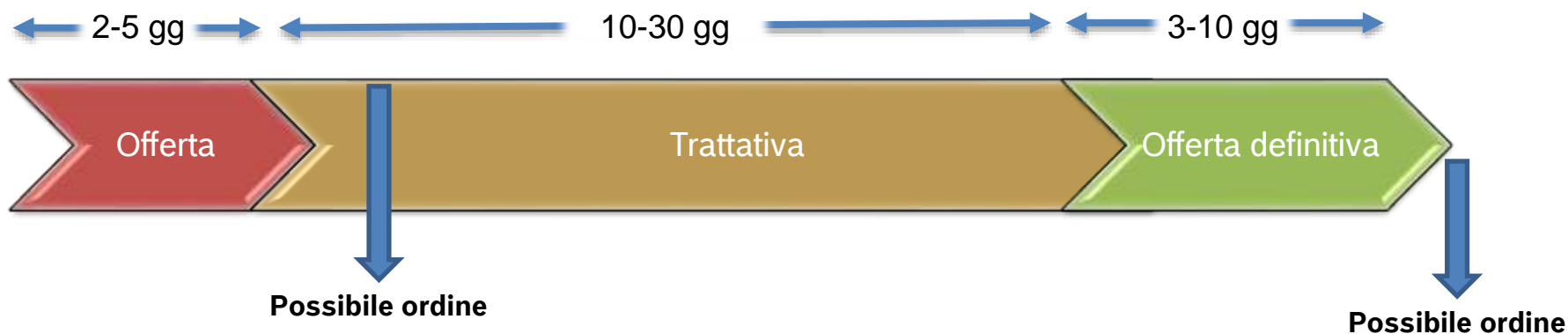


# Flusso di lavoro

## Processo tipico



## Processo reale



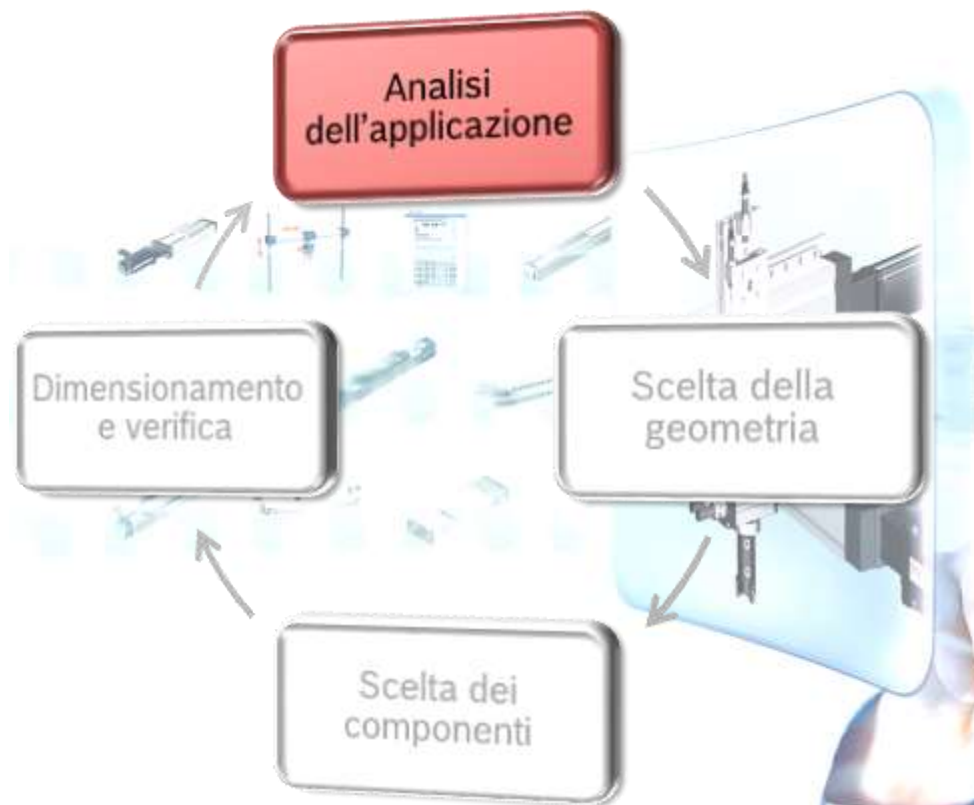


# Progettazione di un Sistema Meccatronico





# Progettazione di un Sistema Meccatronico



# Industria farmaceutica ed assemblaggio



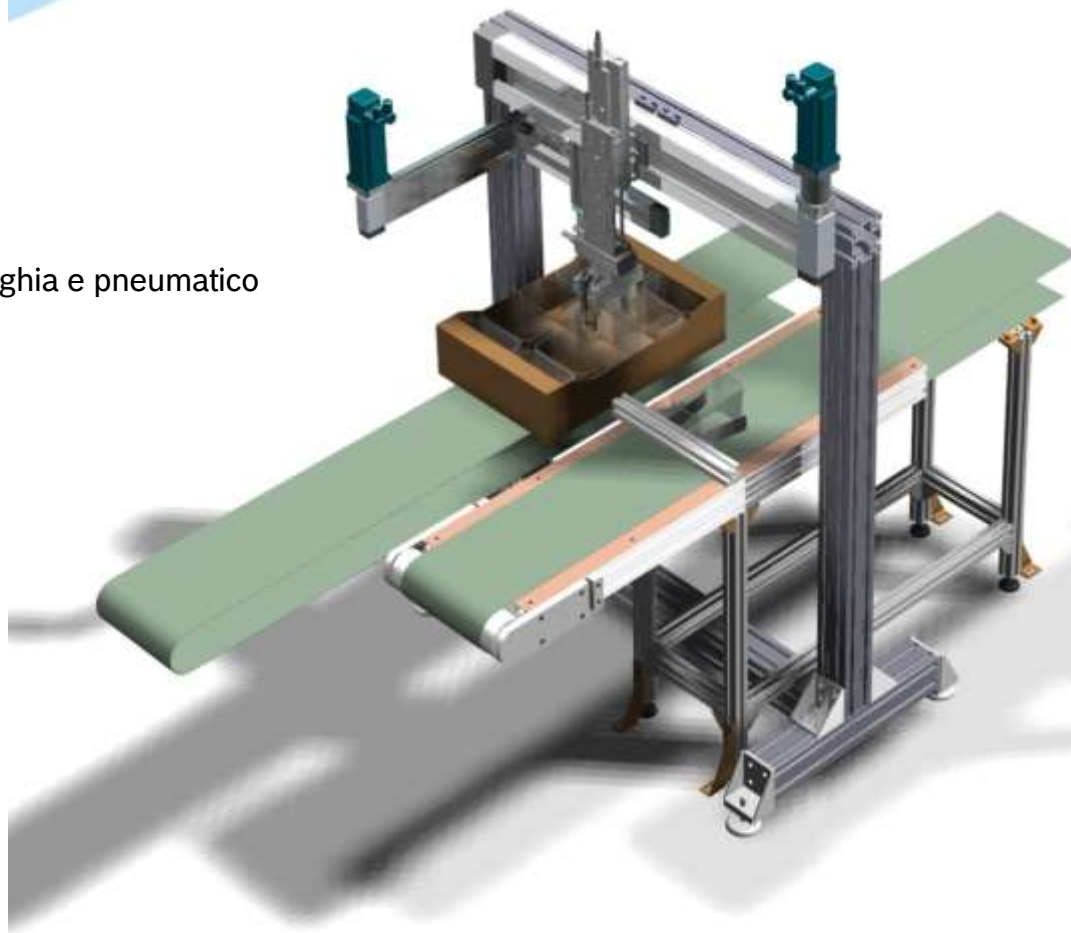
# Incartonatrice panetti di burro

- Azionamento a cinghia
- Monorotaia
- Motori brushless



# Movimentazione cassette di frutta

- Azionamento a cinghia e pneumatico
- Birotaia
- Motori brushless





# Avvitatura e movimentazione testate

- Azionamento a vite e cinghia
- Monorotaia e birotaia
- Motori brushless



# Centro di lavoro per pastiglie freno

- Azionamento a vite
- Birotaia
- Struttura massiccia e precisa





# Macchina riempitrice tubi di silicone



- Azionamento con motore lineare
- Monorotaia



# Magazzino vestiario per ospedale

- Azionamento a cinghia
- Monorotaia

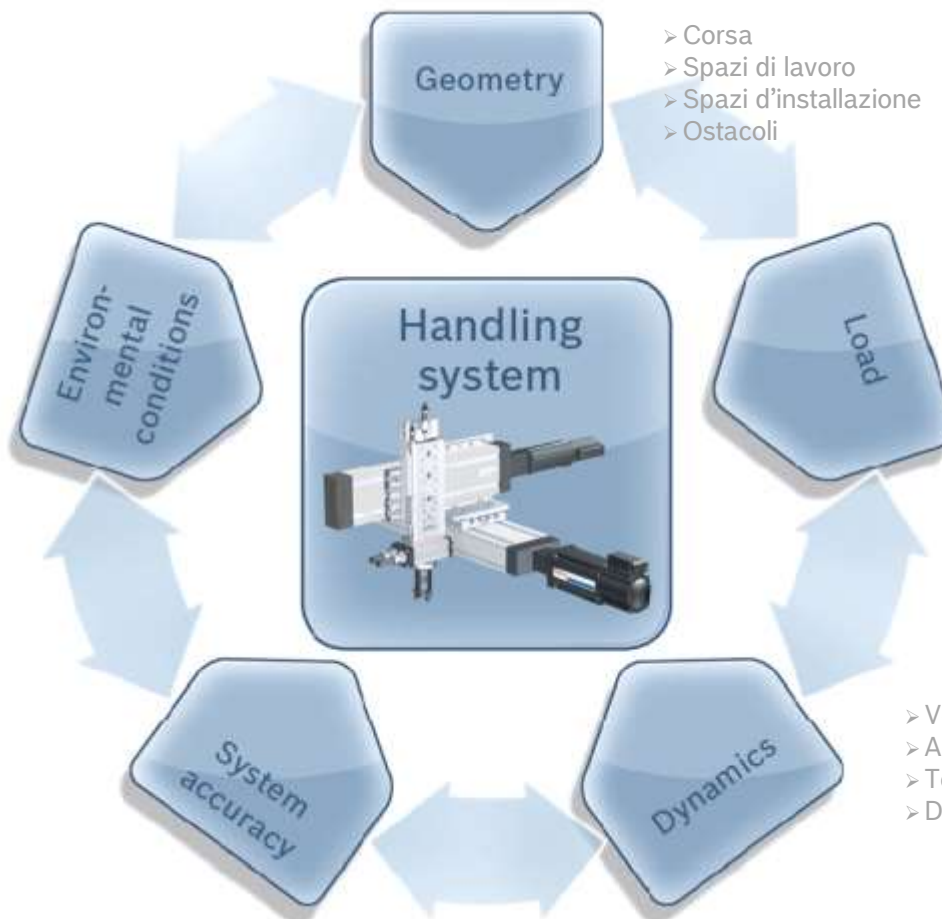




# I parametri di progettazione

- Ambiente operativo
- Temperatura
- Umidità
- Presenza di contaminanti
- Presenza di sporcizia
- Caratteristiche del materiale lavorato

- Precisione di posizionamento
- Precisione della corsa
- Rigidezza
- Necessità di sincronizzazione



- Corsa
- Spazi di lavoro
- Spazi d'installazione
- Ostacoli

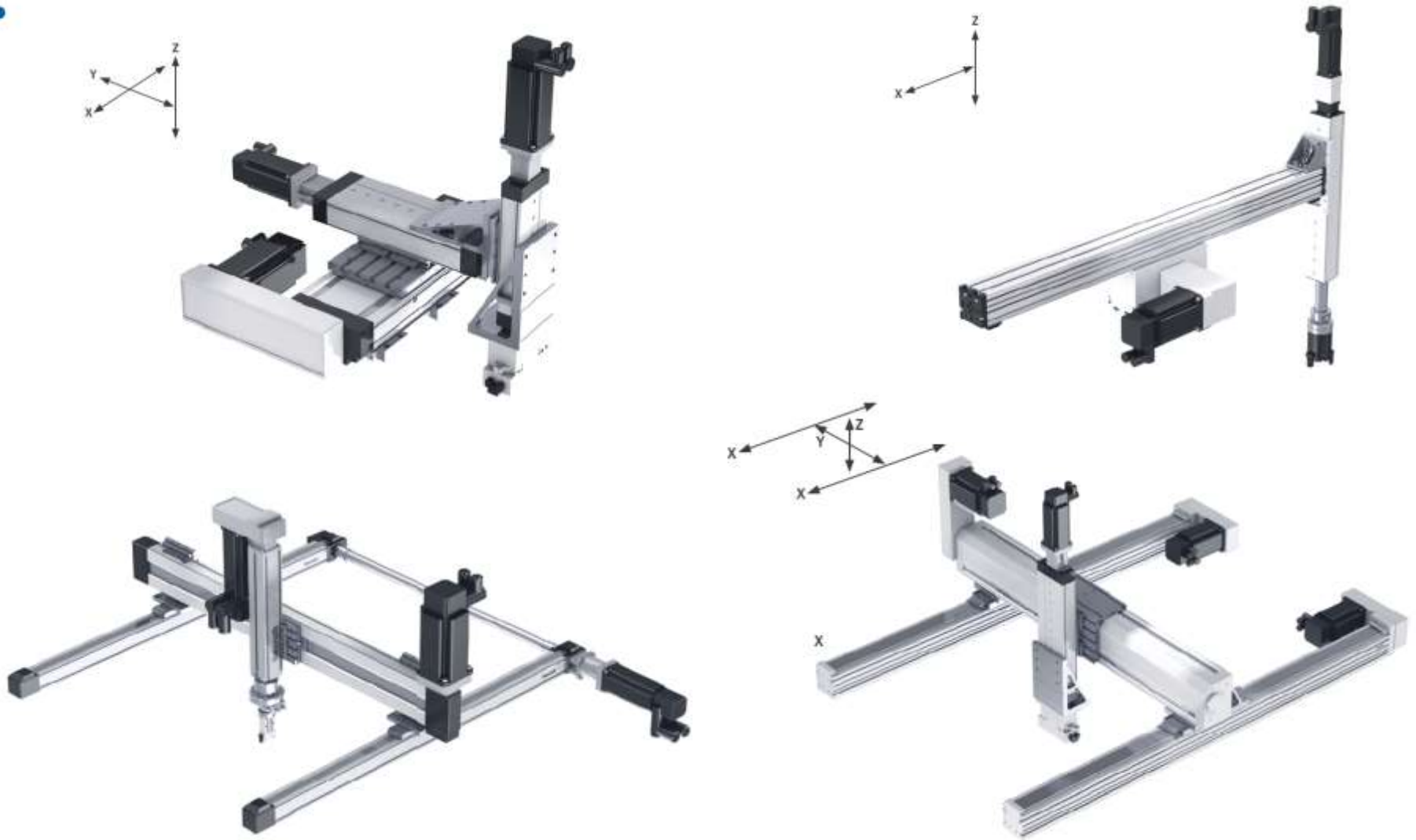
- Masse trasportate
- Forze
- Momenti
- Carichi extra
- Durata a fatica dei componenti

- Velocità
- Accelerazione
- Tempo ciclo
- Dolcezza di funzionamento

# Progettazione di un Sistema Meccatronico



# Esempi di geometrie



# Scelta della geometria

Compact Module CKx

Mini Slide MSC



88

Compact Module CKx



90

Compact Module CKx



92

Linear Module MKx

Compact Module  
CKx (2X-Y)



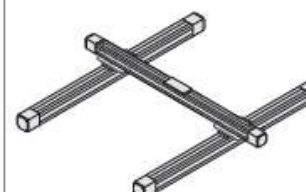
112

Bridge Module BKx



114

Linear Module MKx (2X-Y)



116

Bridge Module BKK

Compact Module CKx



64

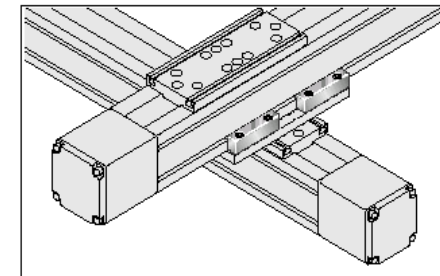
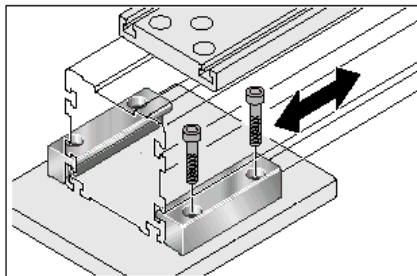
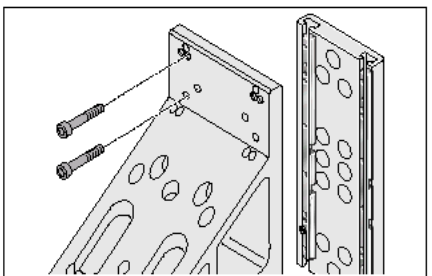
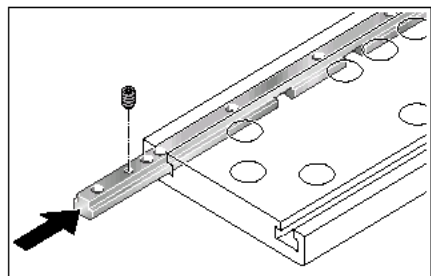
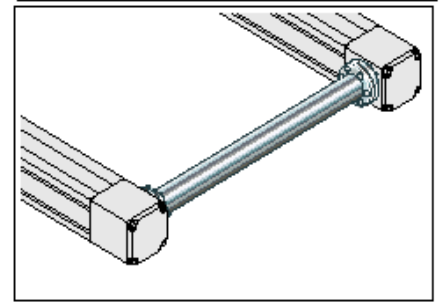
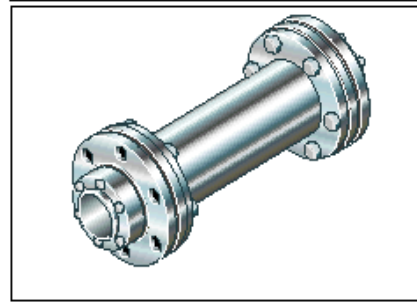
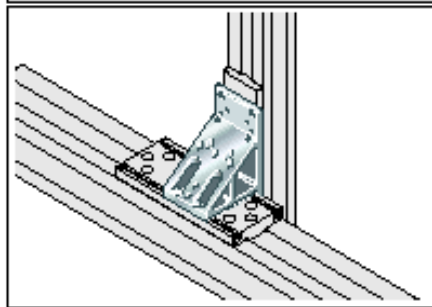
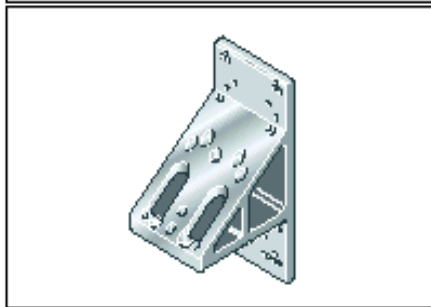
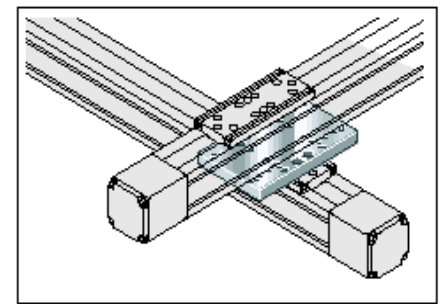
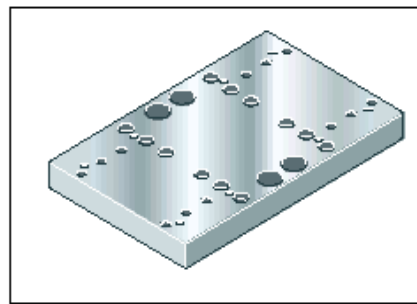
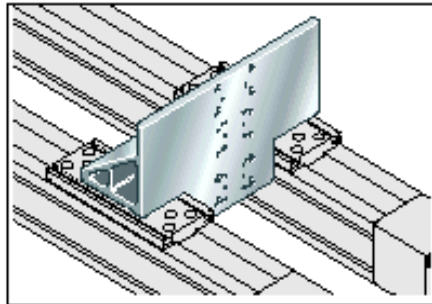
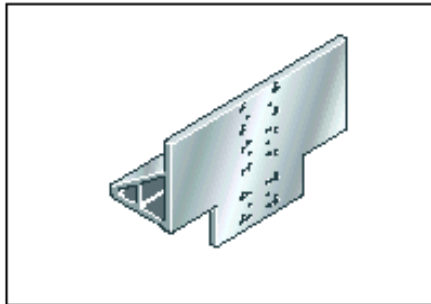
Feed Module VKK



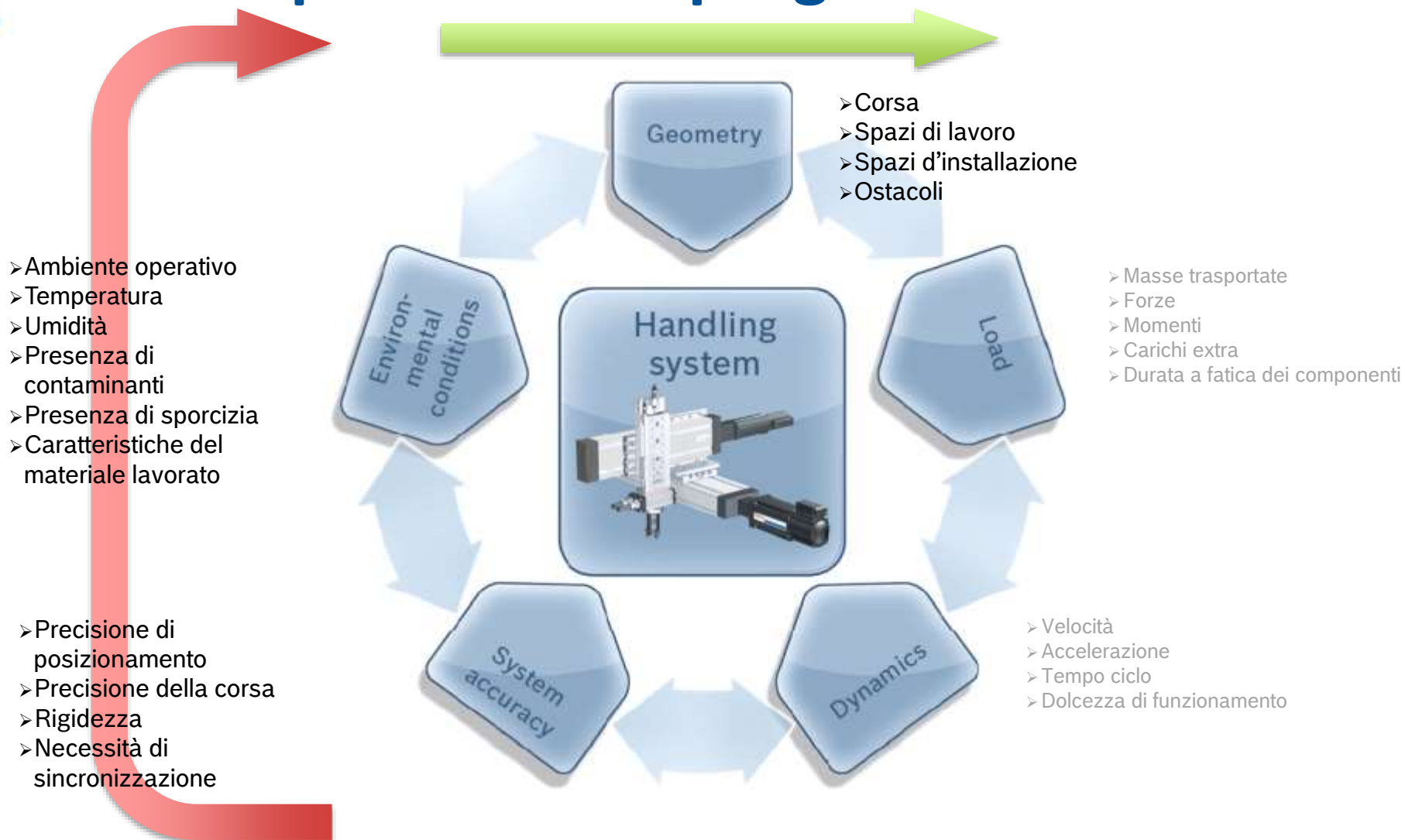
65



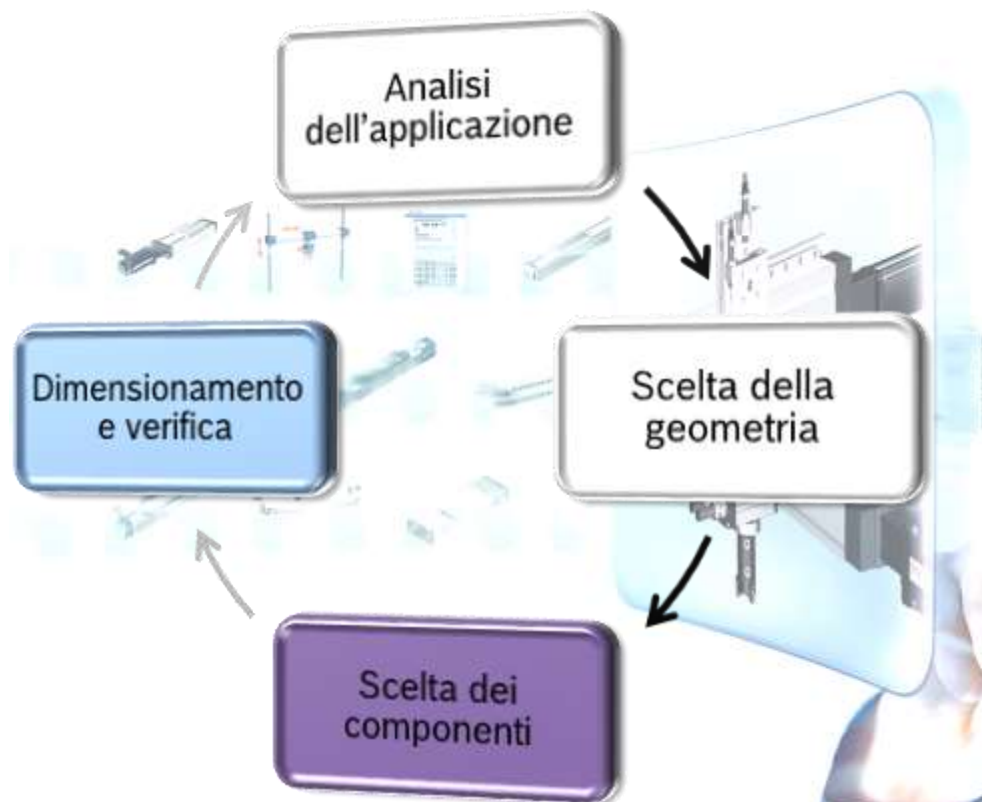
# Scelta dei sistemi di collegamento



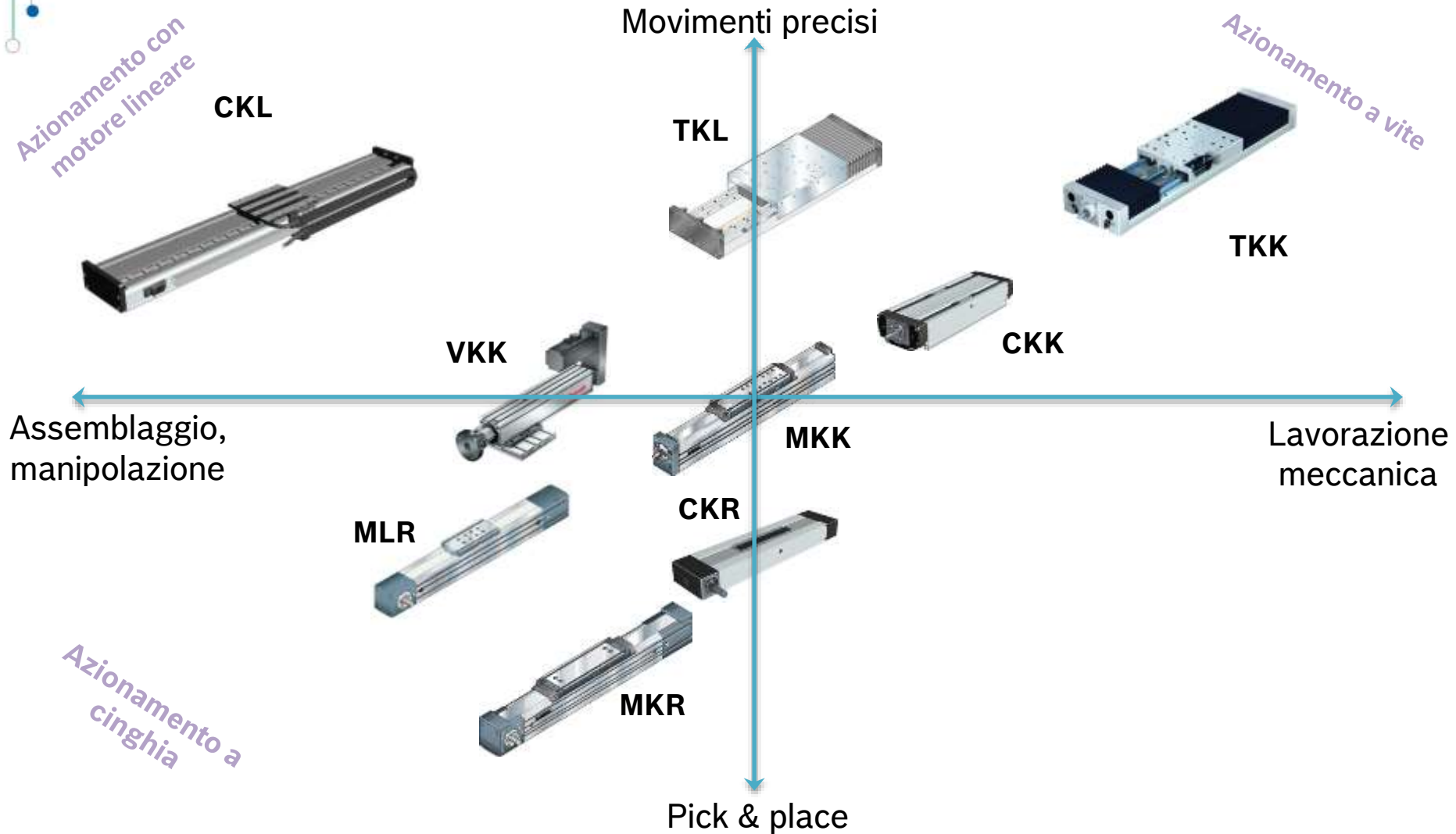
# I parametri di progettazione



# Progettazione di un Sistema Meccatronico



# Scelta dei componenti meccanici



# Dimensionamento

LinSize 3.0.575E

Language \* Imprint \* Terms of use \* Questions/Suggestions \* Help \*

Active project: Unknown Active position: Unknown

**Rexroth**  
Bosch Group

www.bosch.com  
www.boschrexroth.com

**LinSize**

- Project list
- Drive chain
  - Configuration
  - Components
  - Arrangement
- Motion profile
- Unit system
- About LinSize

**Result overview**

Max. perm. acceleration	$a_{max}$	-1.553 m/s <sup>2</sup>	☹
Max. velocity	$v_{max}$	1.875 m/s	
Max. permissible drive torque	$M_{max}$	11.27 Nm	
Inertia ratio	$J_{ex} / J_M$	1.095	
Calculated overrun	$s_{e-calc}$	0.0 mm	
Effective torque	$M_{eff}$	0.00 Nm	
Average speed	$n_m$	0 1/min	
Peak regenerative power	$P_S$	0 W	
Continuous regenerative power	$P_{RD}$	0 W	
Safety factor of brake	$S_{br}$	=	

Diagram: 1-1, 1-2, 2, 3, 4

**Drive chain - components**

1-1 Linear System	CKR-200-NN-1
1-2 Linear System, motor left	CKR-200-NN-1
2 Connecting shaft	ZAE 150
3 Planetary gearbox	LP120S-MF1-10
4 Motor	MSK076C-0450-NN-

Calculate Details Data takeover

**Input**

	Component	Arrangement
Payload	270.000 kg	
Axis orientation		
Moved part	Carriage	
Installation position	Vertical	
Angle of inclination	90	
Counterbalance - force		N
Counterbalance - mass		kg
Friction force		N

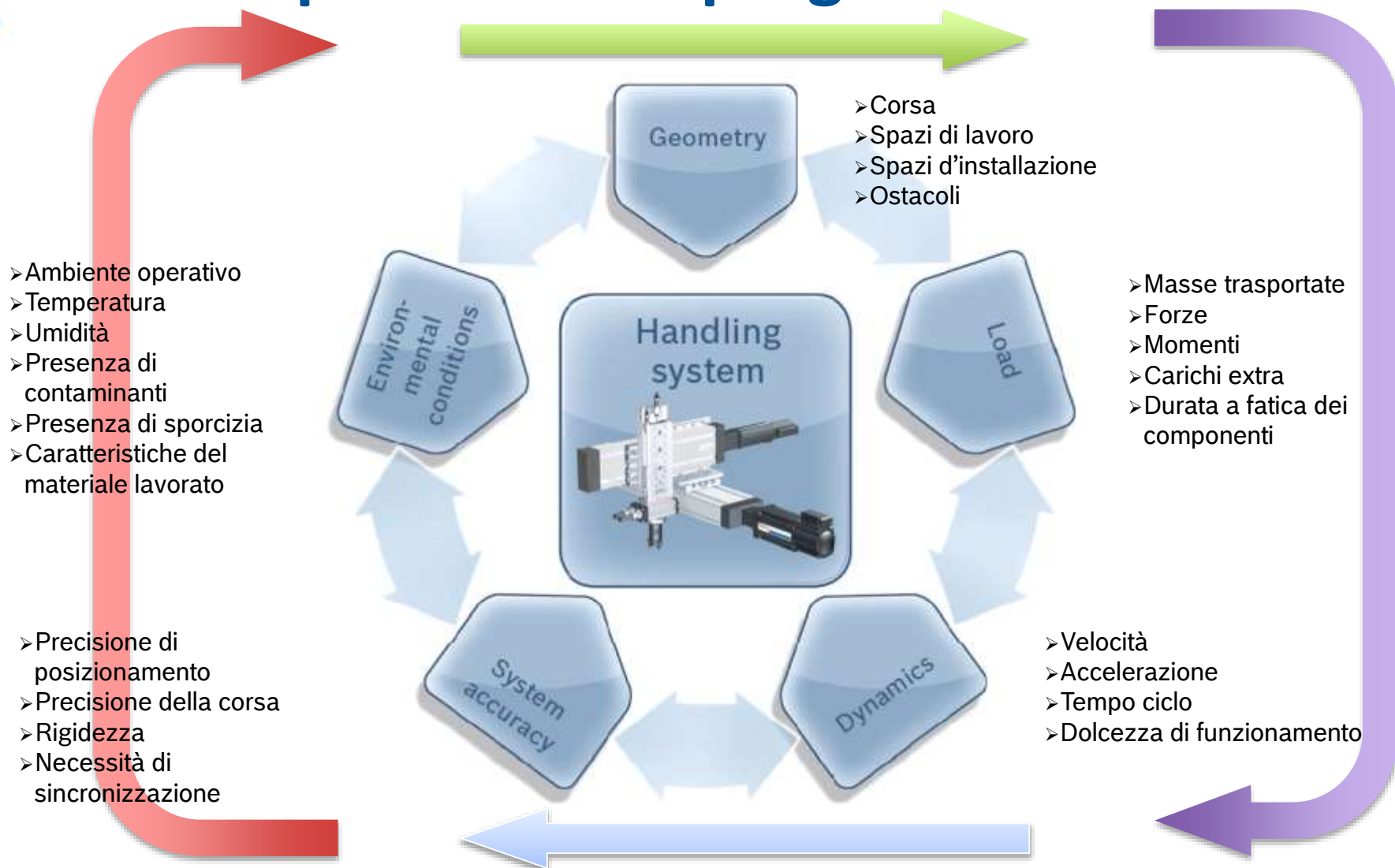
**Masses:**

Energy chain		kg
Upper axis		kg
Carriage	8.6	kg
Total mass to be moved	278.6	kg

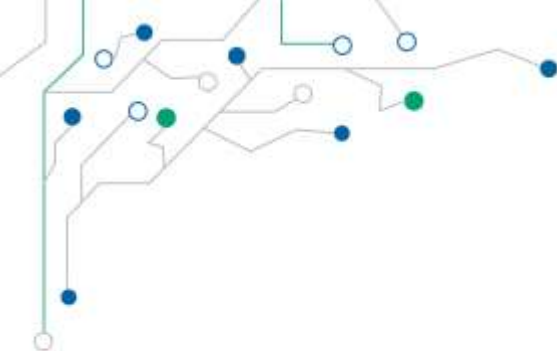
Help



# I parametri di progettazione







***Grazie***

Andrea Piatti  
Bosch Rexroth S.p.A.