

A U F Z U N E U E N H O R I Z O N T E N



SCHUNK Mechatronics & Modular Robotics

Dr. Roko Tschakarow

- » SCHUNK business units
- » Factories
- » Components and Solution Provider
- » Mechatronics and Modular Robotics
- » Applications



Toolholding & Workholding



Toolholders



Stationary workholding



Lathe chucks



Chuck jaws



Hydraulic Expansion

Automation



Grippers



Rotary



Linear



Robot accessories



Modular Robotics



Industry solutions



GEMOTEC



Image processing



**Werk Lauffen/Neckar
Deutschland**



**Werk Mengen
Deutschland**



**Werk Brackenheim-Hausen
Deutschland**



**Werk Morrisville
North Carolina, USA**

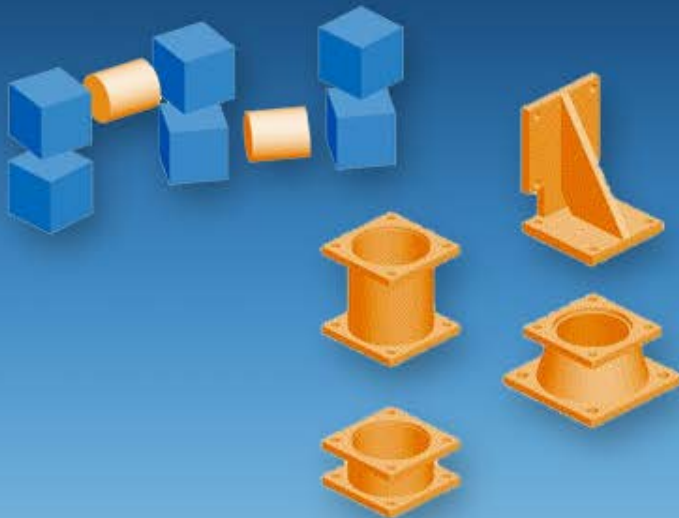
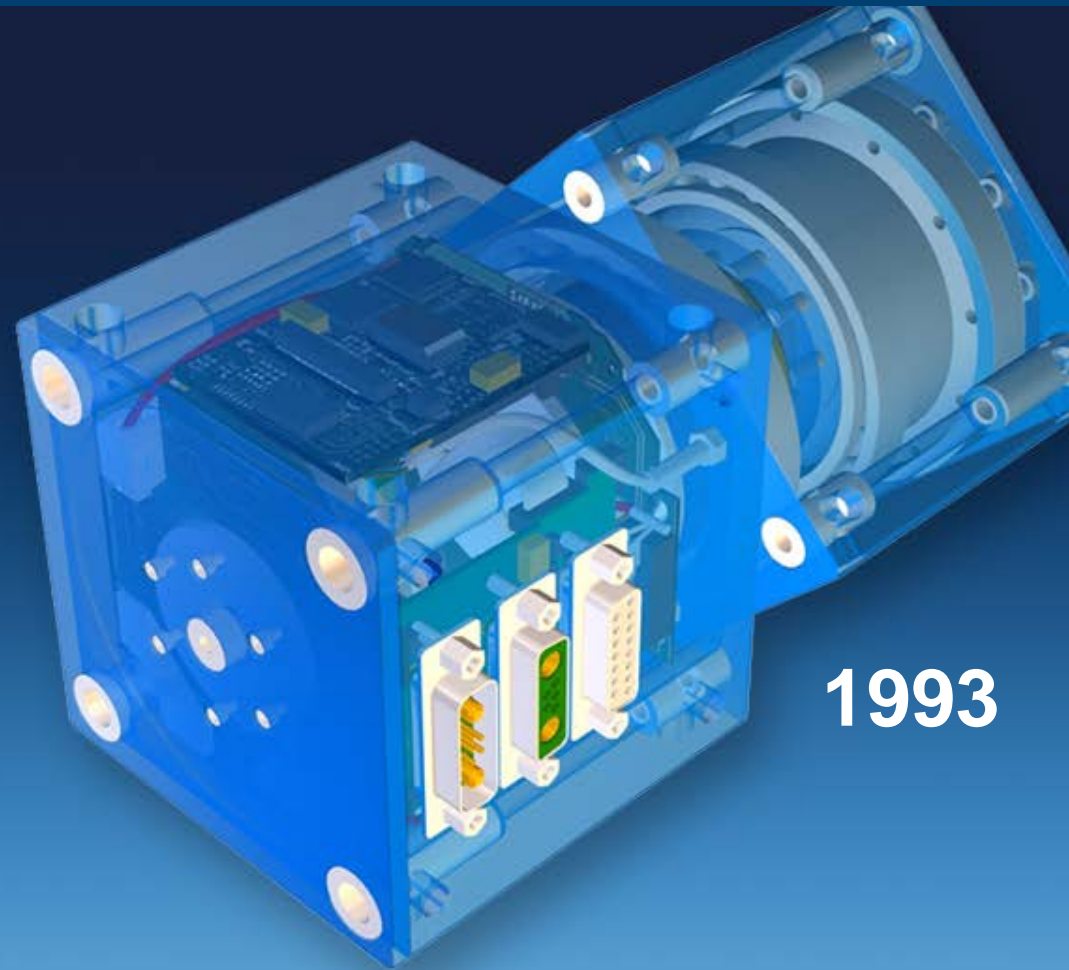


**Werk Hangzhou bei Shanghai
China**

STANDORTE

The idea of Modular Robotics

- Brushless Servo
- Standard Industrial Networking
- Integrated Electronics
- Modular ‚Building Block‘ System
- Light Weight Design
- Modular Robotics – what good is it?



1993

- Overview over the different robotic components
- Each in 3 sizes



PG
Servo electric
2 Finger Parallel Gripper



PR
Servo electric
Rotary Joint



PW
Servo electric
Pan Tilt Unit



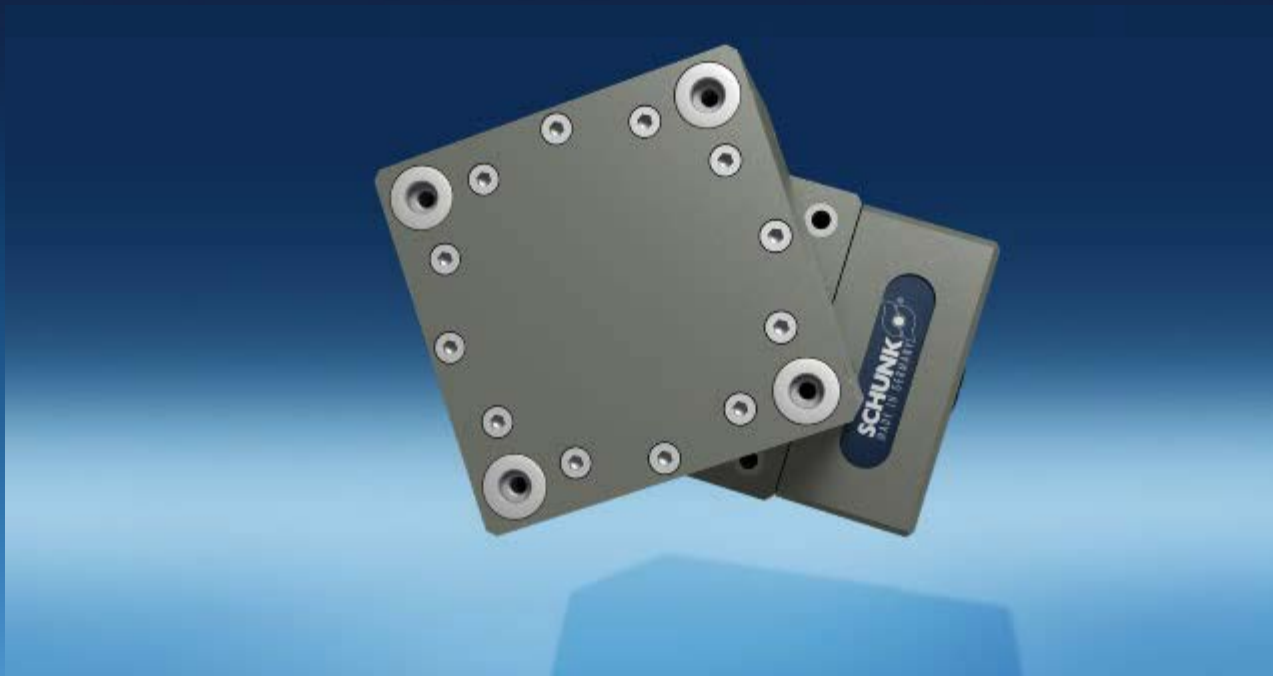
PSM
Servo motors with integrated
Position Control



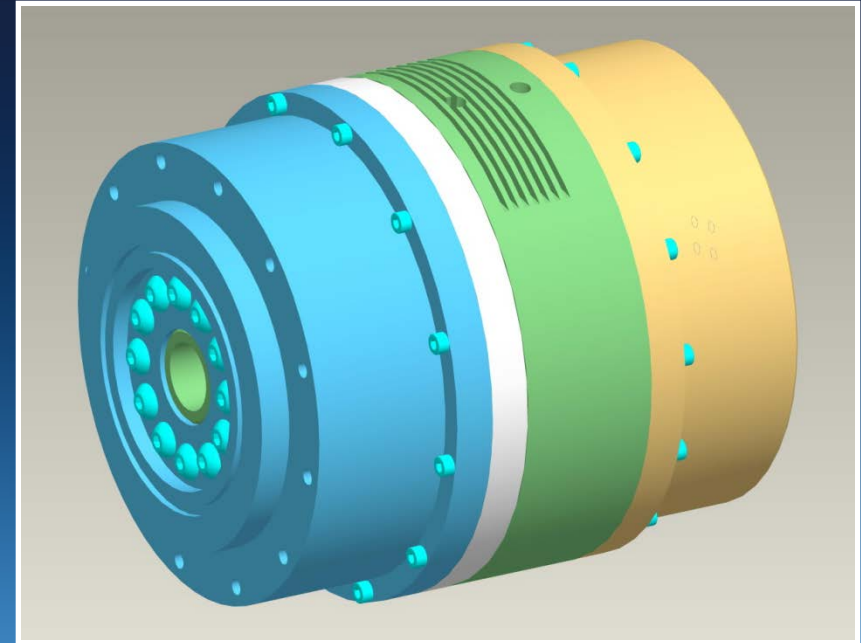
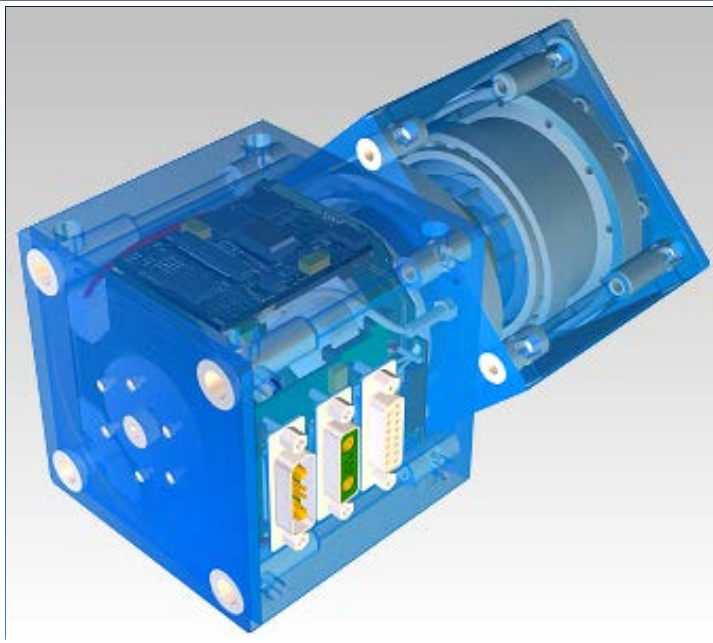
PDU
Servo Positioning Drive with
Gear Head



PLS
Servo Linear Actuator



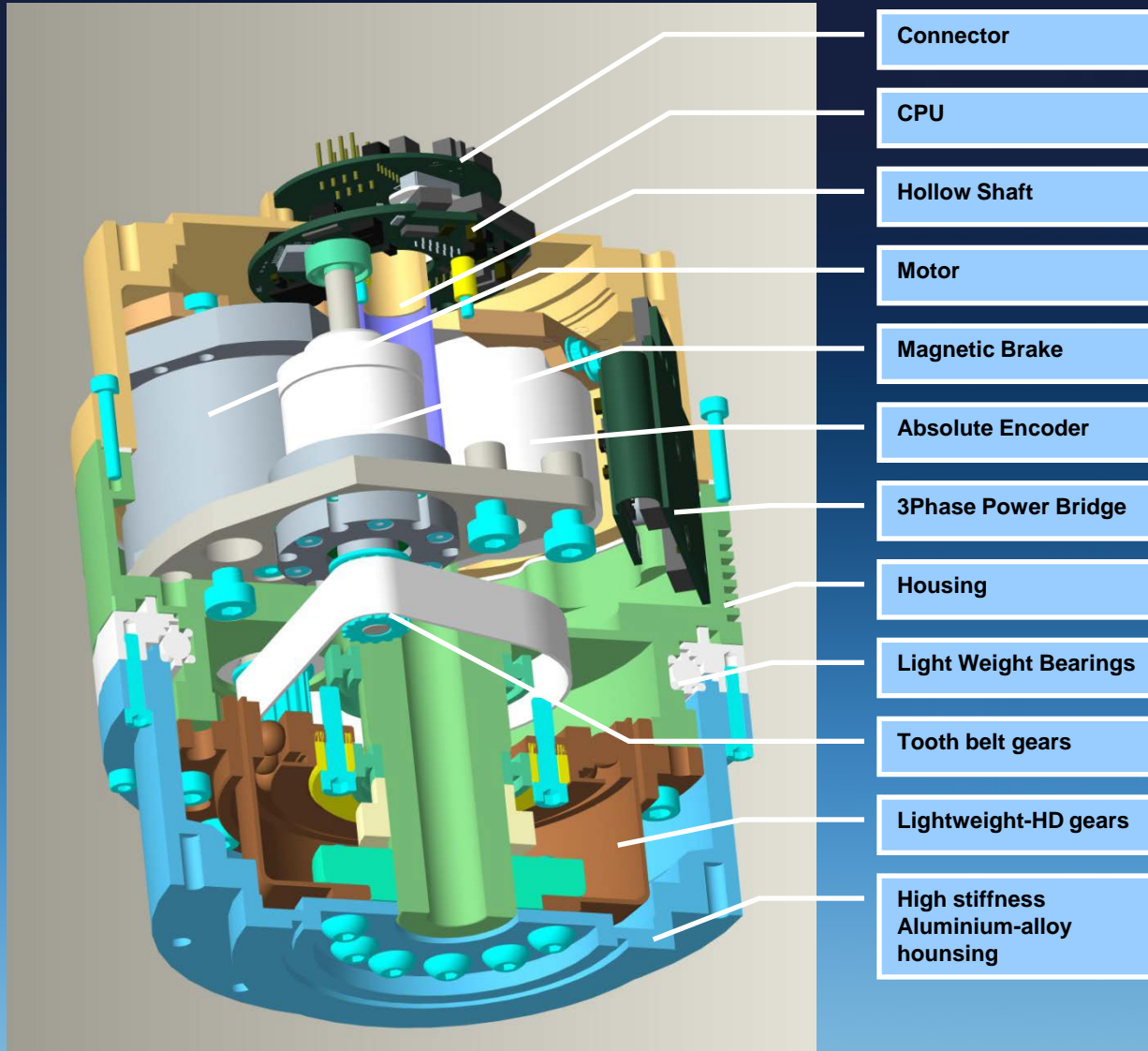
Light Weight design for Modular Robots in Service Apps



Targets for a Light Weight Modular Robot capable for modern robotic applications:

- Min. power dissipation
- Best Weight-Torque-Ratio
- 10 kg payload @ 7DOF
- Internal Media
- Absolute Encoder
- Graceful Degradation
- Miniaturization & Costs
- Min. Sound emission
- Reliable, Dependable

New Light Weight Robotic Joints



Rotary Robotic Joints

- 4 sizes
- Light weight design
- Excellent Weight-Torq.-Ratio
- quiet
- modular and reconfigurable
- Internal cabling



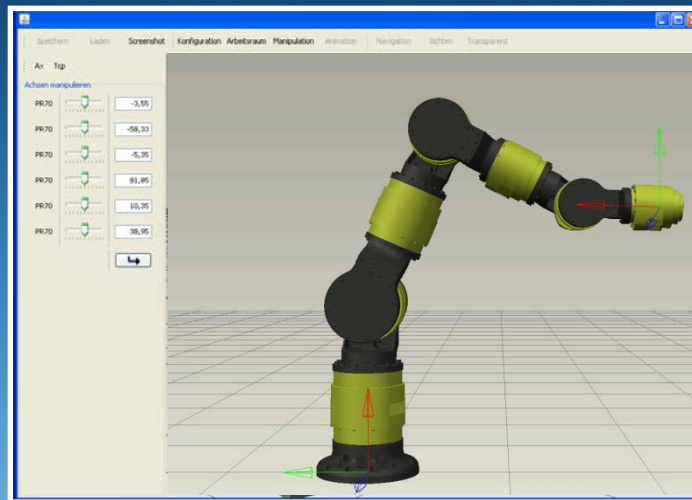


Rotary Modules

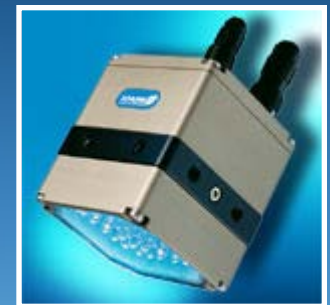
Linear Modules



Grippers



Configuration / Simulation / Control



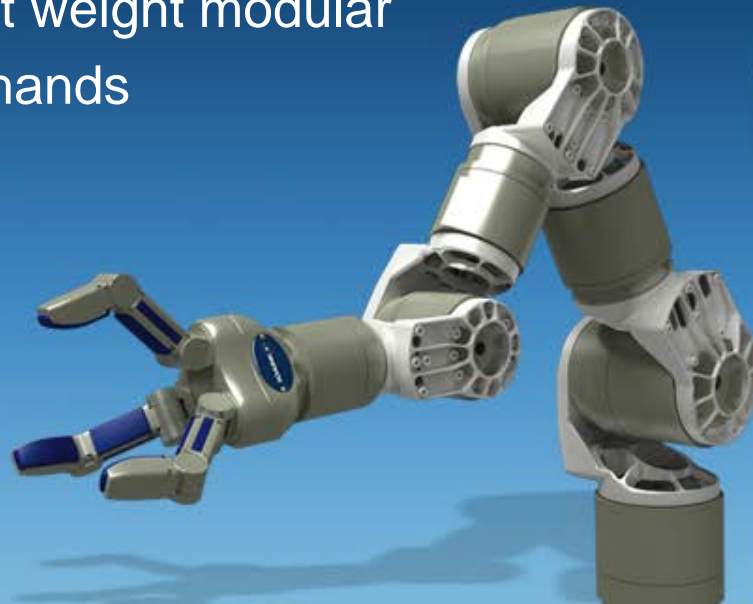
Sensors



New Grippers and Robotic Hands



Reconfigurable light weight modular robots and robotic hands

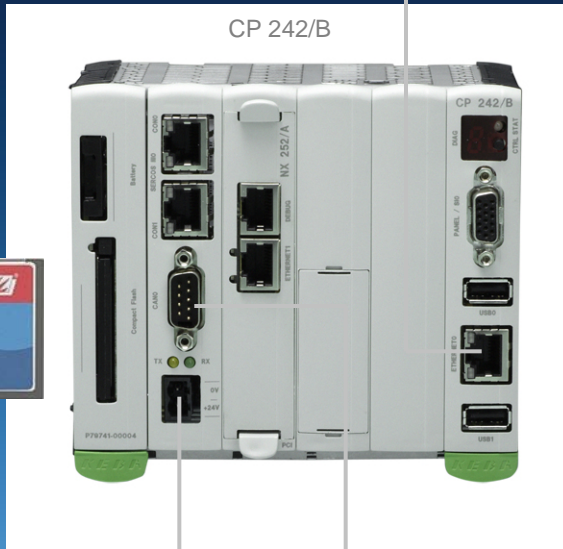




KeTop T50

Ethernet

CP 242/B

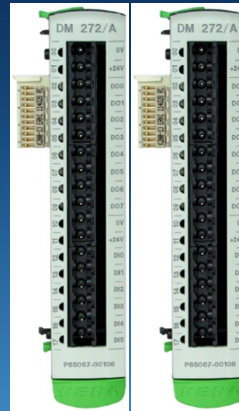


Compact Flash

24V
PowerSupply

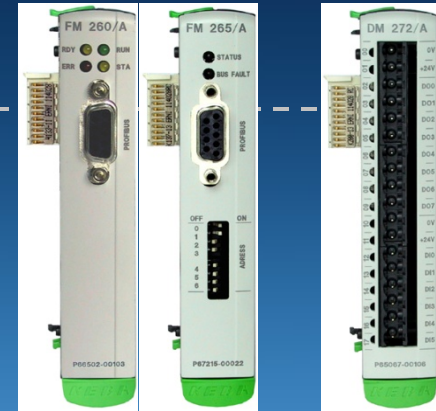


CAN



DM 272/A

KBUS



FM 260/A

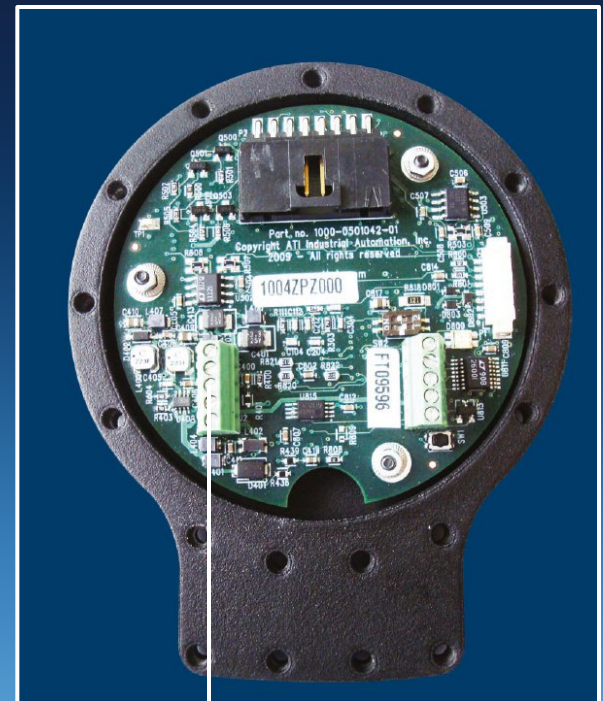
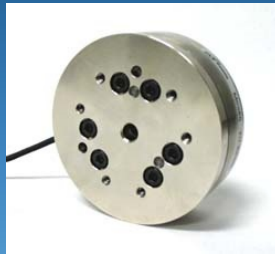
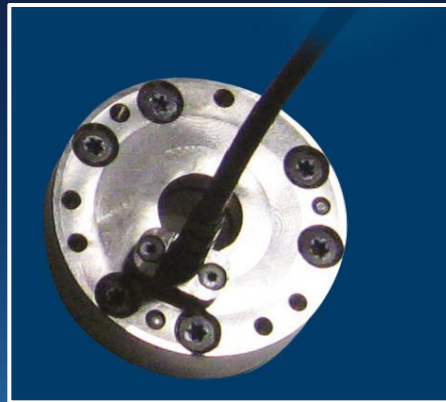
FM 265/A

optional div I/O-Karten
über KBUS



Force Torque Sensors

Force Torque Sensors in 13 sizes
Smallest diameter: 17 mm



CAN

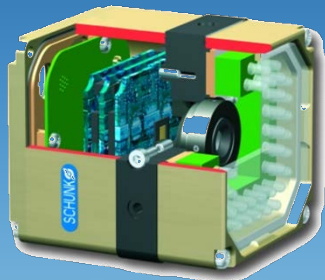
Vision Sensor SVS



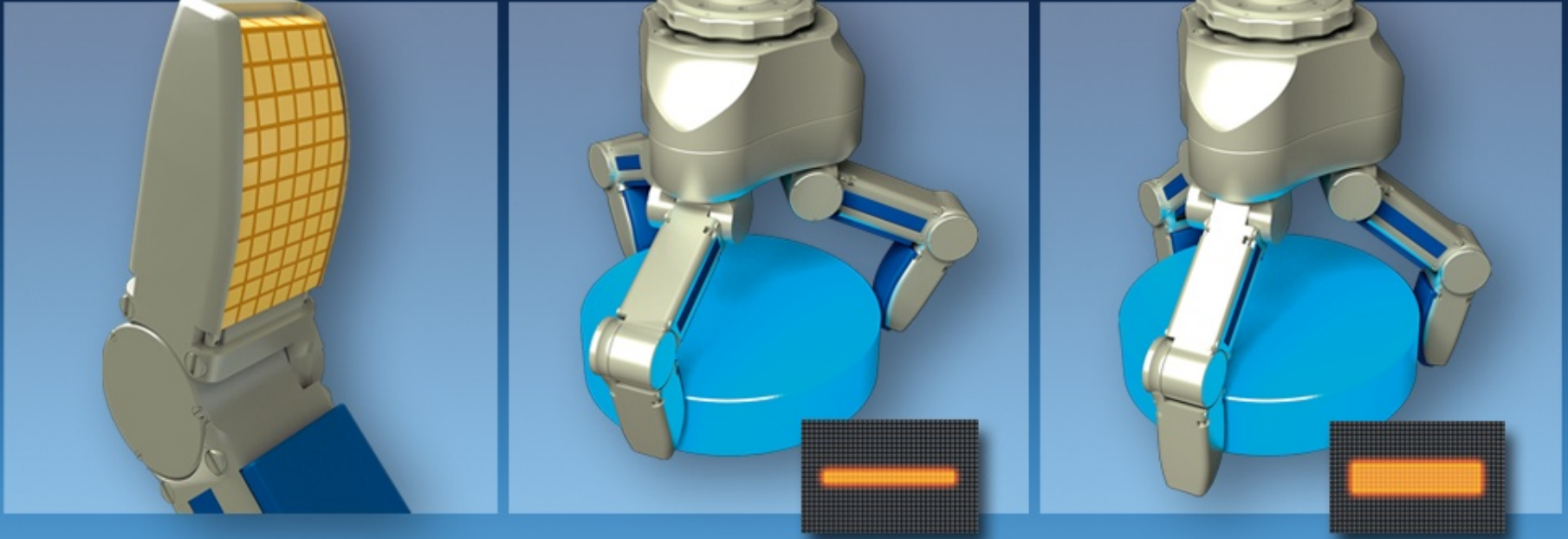
Stereo Vision and TOF cameras



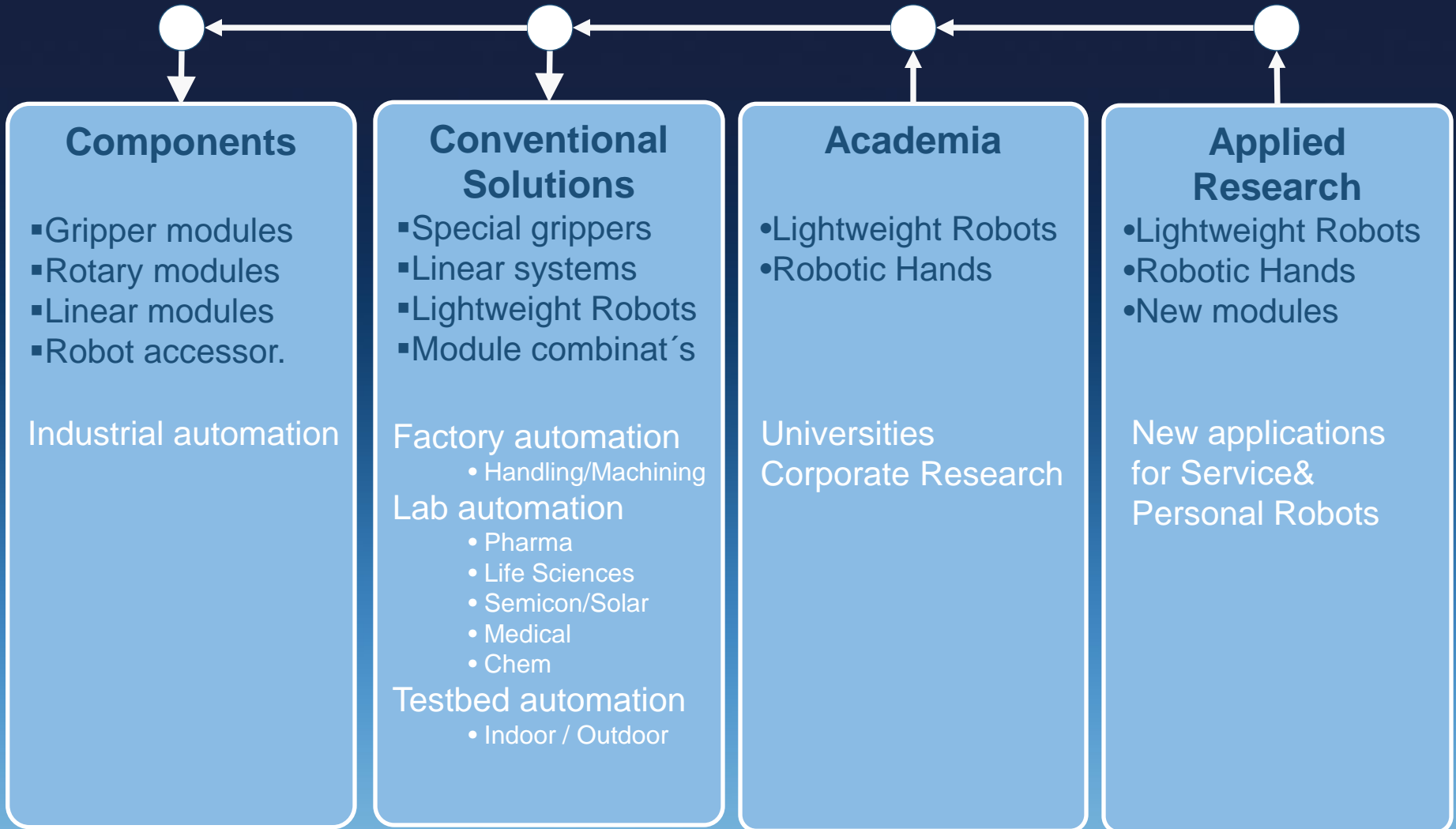
3D based on laser range finders



In combination with Pan-Tilt-Units







Dependable and Reliable:

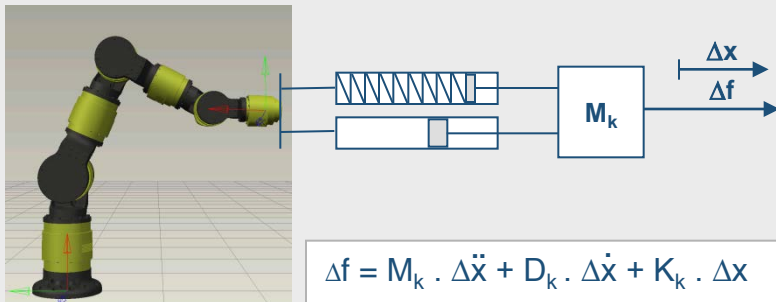
- Light Weight Robots
- Robotic joints
- Robotic hands
- Force Torque Sensors
- Image Processing
- Configuration software
- Control software

R&D work:

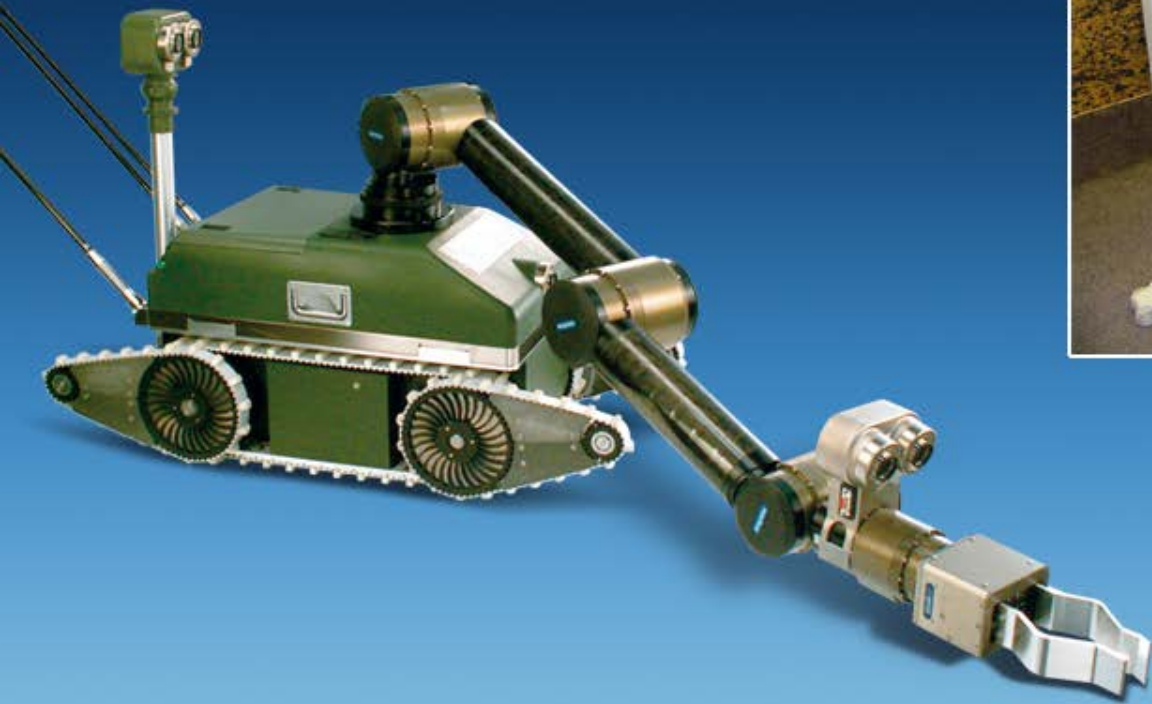
- Force / Impedance / Admittance control
- Visual Servoing
- Sampling and Safety Robots
- Mobile Manipulation
- Rehabilitation Robots
- Medical Robots
- Locomotion



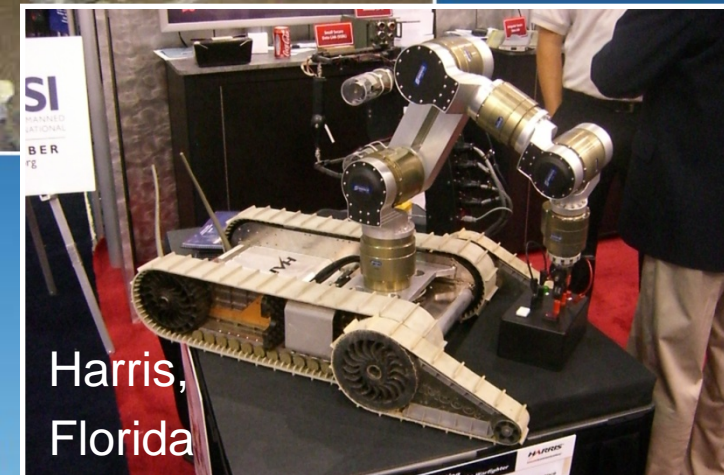
Mass-Spring-Damper-Model



- Sampling robots, Tracking robots, EOD robots, Rescue robots
- Security and military robot systems
- Prototyping for space robots



NASA JPL
Pasadena



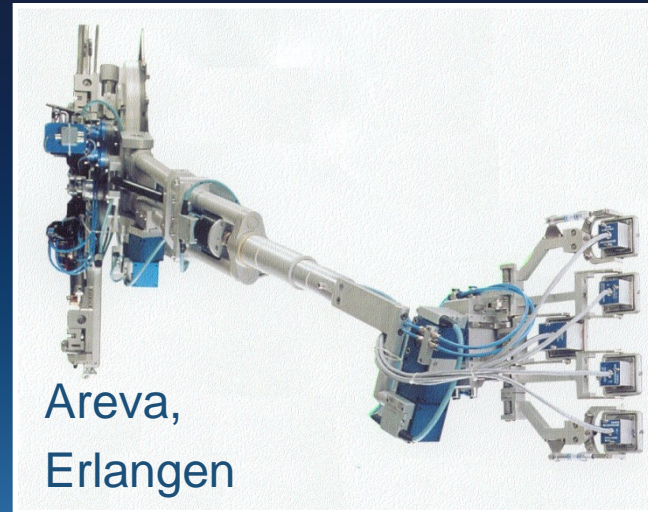
Harris,
Florida

Samplers:

- Measuring robots
- Lab robots
- Clean room robots
- Outdoor robots



Robots in logistics, mobility solutions, Energy:



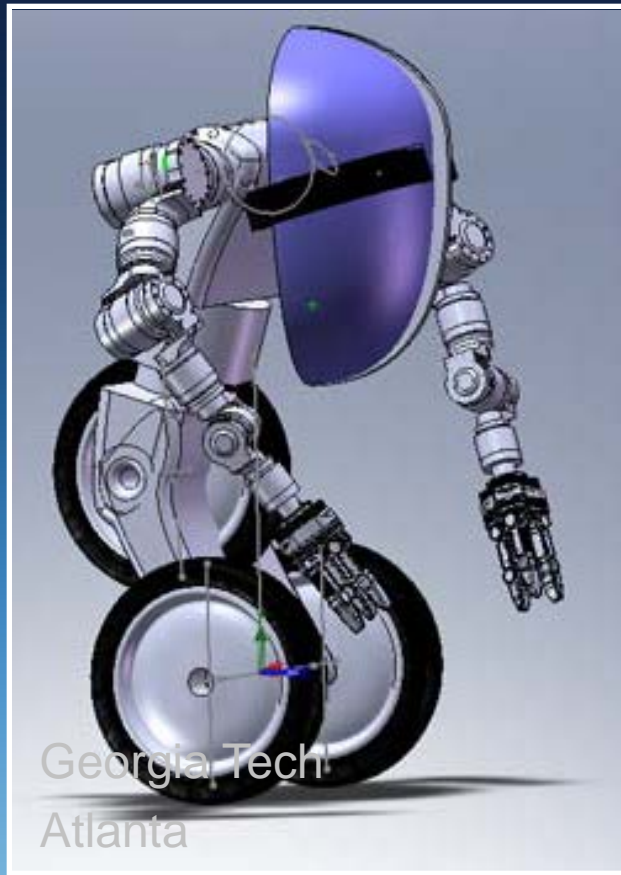
Mobile Manipulation, Cognition, Localization, etc:



Idaho National Labs



Mobile Robots,
Amherst



Georgia Tech
Atlanta



Georgia Tech
Atlanta

Robots in Rehabilitation, Care and Service



Care providing robot FRIEND
AMaRob, IAT, Bremen



Care-O-Bot
Fraunhofer IPA



Cotesys
TUM, Munich

- Beneficial Partnership in R&D for Robotics
- national and international Robotic Programs
- e.g. ECHORD, next call: Network robots
- Expert Days on Service Robotics



INTERNATIONAL
EXPERTDAYS
SERVICE ROBOTICS
FEBRUARY 24TH - 25TH, 2010 - HAUSEN - GERMANY

A U F Z U N E U E N H O R I Z O N T E N

Thank you for your attention.