

Technology Cooperation

**SIEMENS**

**KUKA**

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# **Joint Press Conference by Siemens and KUKA**

EMO Hanover – September 17, 2013

## Speakers

### **Manfred Gundel**

CEO  
KUKA Roboter GmbH

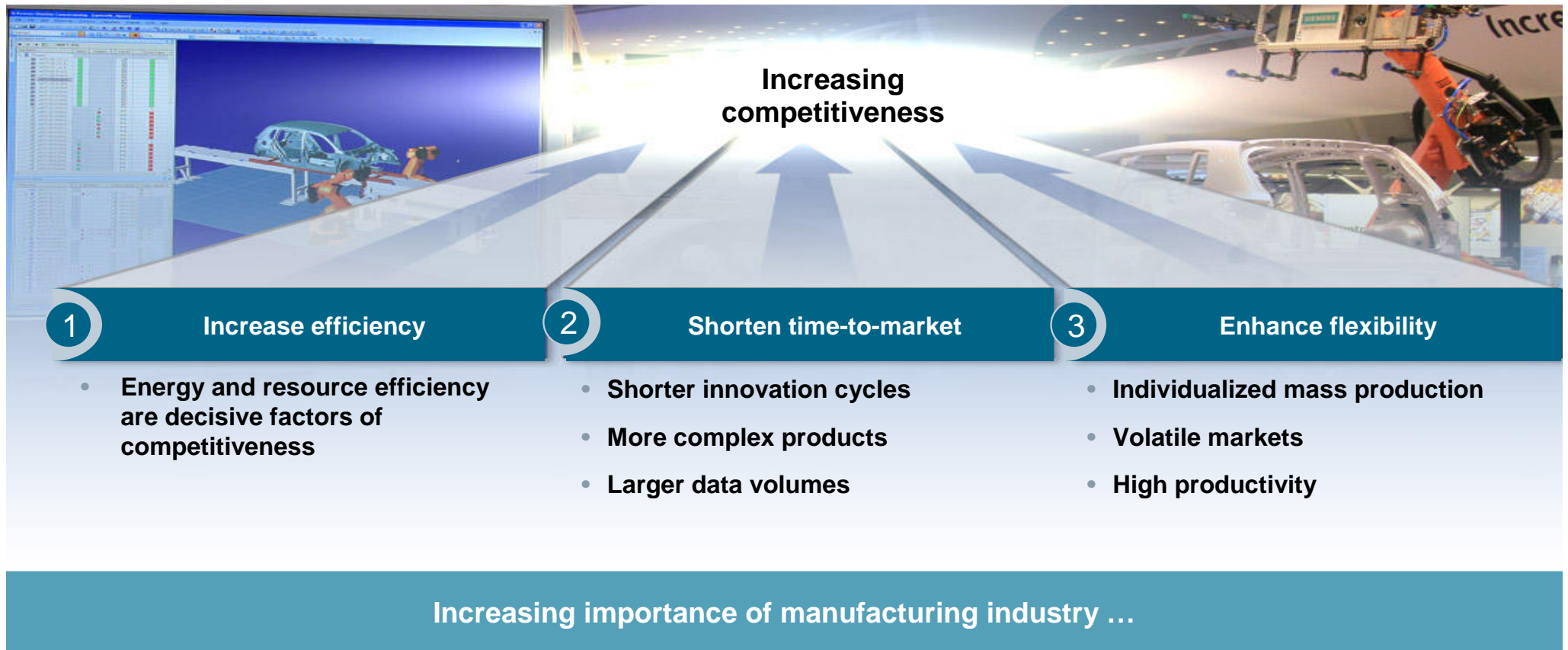


### **Dr. Robert Neuhauser**

CEO  
Business Unit Motion Control Systems,  
Siemens Drive Technologies Division



# Manufacturing is changing faster than ever before



## Automation potential due to changes in manufacturing

Loading and unloading

Machining in conjunction with a CNC machine

Lightweight construction



**Huge potential for cooperation between KUKA and Siemens**

## What is required of industry?

Multiple machining of a single part  
(e.g. milling, drilling, testing)

CNC programming for robot applications

Integration into CAD/CAM/CNC design chain  
similar to machine tools with SINUMERIK

Large working range

Good accessibility (6 axes) on all sides of the workpiece



**Cost and space savings, precision to match requirements and CNC operation**

# CNC integration of robots

## Technologies and machining processes

### Machining large and irregularly shaped workpieces:

- Drilling and riveting
- Composite tape laying
- Water jet cutting
- Simple milling, thread cutting, roughing and trimming
- Ultrasonic cutting
- Deburring
- Inspection
- Marking and painting
- Welding
- Laser cutting and welding



High productivity in numerous technologies

## Applications of CNC integration of robots in established industries



Aerospace



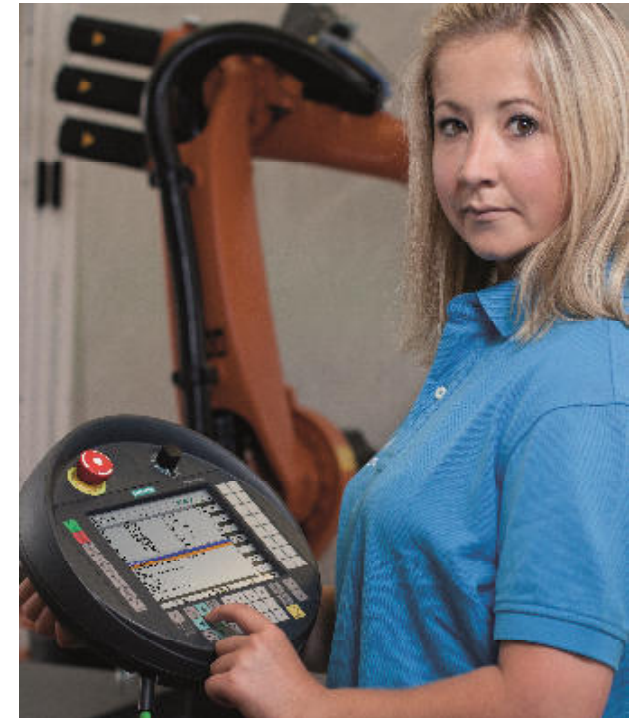
Automotive



Plastics



Power



Wide range of applications for CNC integrated robot solutions

## Siemens and KUKA

### Objectives of cooperation

Shared solutions offered: expand integrated, operator-friendly loading of machine tools with robots

Integration of robotics and CNC solutions for machining workpieces with robots

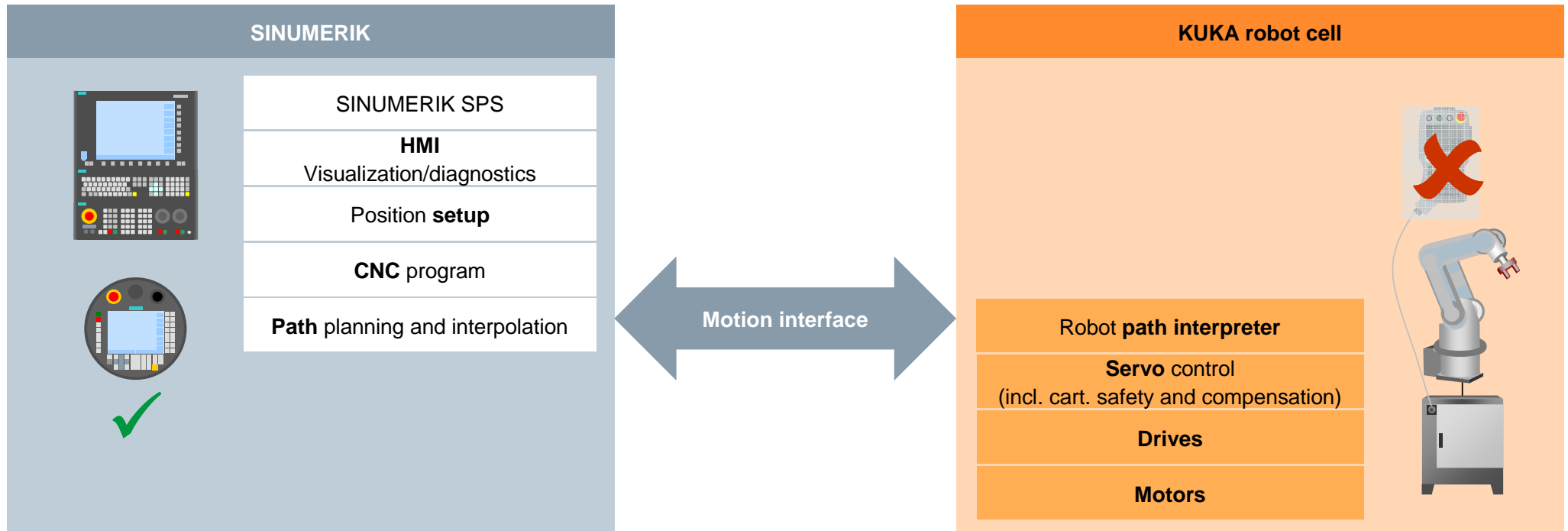
Development of integrated processes:  
integrated engineering along the entire value chain

Development of new applications in numerous industries

**Shared marketing creates added opportunities.**



# SINUMERIK programming and operation for KUKA machining robots

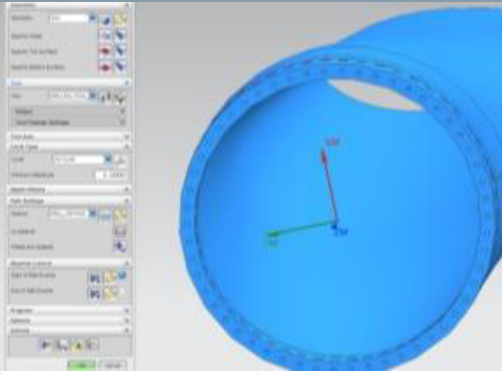


- CNC program, setup of the position and visualization by the **SINUMERIK CNC**.
- **Robot control** performs servo positioning, inverse transformation, compensation (precision enhancement) and cartesian safety.

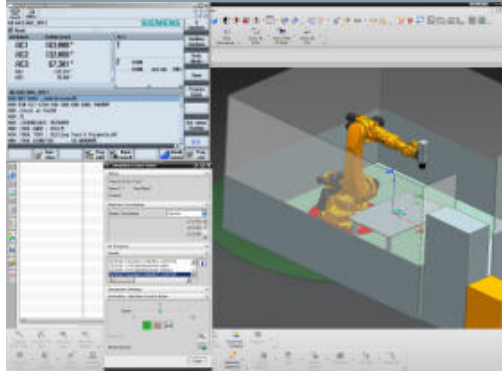
# Integrated engineering along the entire value chain

## Post-processor for processing with KUKA robots

### Programming



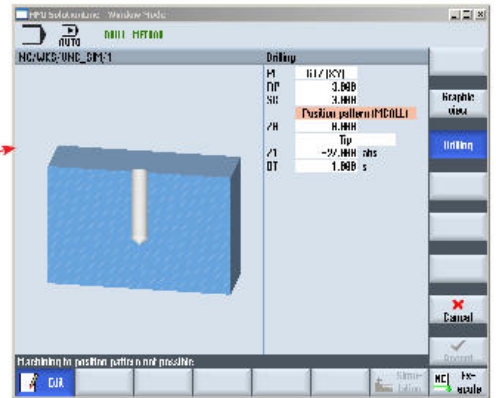
### Trial run / simulation NX CAM simulation



### Production

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N200 #
          
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Drilling	Graphic view
F1	0.1/0.1
F2	3.000
F3	3.000
F4	Position pattern (MCALL)
F5	8.000
F6	Tip
F7	-59.000 mm
F8	1.000 s

Highly efficient process from design to finished part

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## Advantages of cooperation

Added value for customers

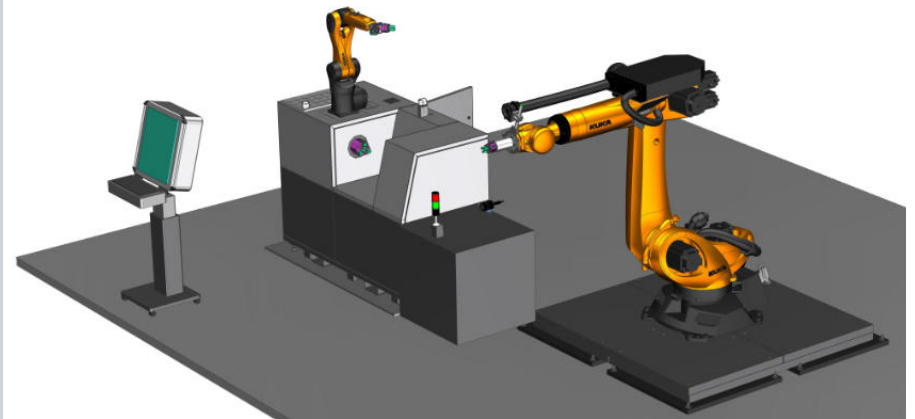
CNC operation using established SINUMERIK

Integration into Siemens CAD/CAM/CNC chain

Strength in common end customer industries

Proven compensation and cartesian safety  
from KUKA

Robot kinematics from KUKA can  
absorb process forces and is proven in practice



**Strengths are united!**