

THE LEADING CULTURE OF AUTOMATION.



**THAILAND
AUTOMOTIVE
INSTITUTE**
สถาบันยานยนต์



COMAU IS

The Leading Culture of Automation

Video



Comau is a leading global provider of advanced manufacturing system, innovative sustainable automation and service solutions.

With a strong history in the automotive industry, we have continued to grow, and today we offer our skills and know-how a wide range of industries and applications

Production Systems

ASSEMBLY

- Aircraft Structures
- Automotive Body
- Commercial Truck Body
- Engines & Transmissions
- Heavy Industry Vehicles
- Rail Cars
- Renewable Energy Systems

MACHINING SOLUTIONS

- Crankshaft
- Cylinder Head
- Engine Block
- Transmissions

TESTING SOLUTIONS

- End of Line Test
- Cold Test
- In-Process Test
- Hot Test

JOINING TECHNOLOGIES

- Adhesive Applications
- Arc Welding
- Flow Drill Screw
- Laser Welding/Brazing/Cutting
- Riveting/Clinching
- Spot welding

OTHER TECHNOLOGIES

- Automatic Guided Vehicle
- Material Handling
- Plasma Transferred Wire Arc
- Roller hemming

Robotics

High Performance Smart Technology

- A complete range of innovative robots from 6 to 500 kg payload
- Reliable and powerful C5G control Unit
- User-friendly programming terminal / available in wireless version
- Process-oriented software dedicated to each application
- A complete set of application equipment and accessories
- Plug & Play standard robotized cells for arc welding application

Application Fields

- Arc welding
- Spot welding
- Handling / palletizing
- Press-to-press automation
- Gluing
- Foundry

1973

Several companies in the Turin area create **CONSORZIO MACchine Utensili**
都灵地区的几家公司创建了
CONSORZIO MACchine Utensili

1977

Establishment of **Comau Industriale** with powertrain and body (welding, assembly and handling) divisions
柯马工业设立动力总成和车身(焊接、装配和装卸)部门

1978

Comau S.p.A. is established incorporating Comau Industriale activities
将柯马工业的活动集合在一起，成立**Comau S.p.A.**



1995 - 97

Comau opens plants and offices in Germany, Brazil, Argentina, France and India
柯马在**德国、巴西、阿根廷、法国和印度**设立工厂和办事处

1998

Establishment of **Comau Service**
柯马工业服务成立

1999

Comau acquires Renault Automation in France and Pico in USA, Mexico, Germany and UK
柯马收购**法国雷诺自动化公司以及Pico公司在美国、墨西哥、德国和英国的公司**



2000 - 03

Comau China, Romania and Russia are established
成立柯马**中国、罗马尼亚和俄罗斯**公司

2009

Establishment of **Comau Aerospace**
成立柯马**航空事业部**



2010

Establishment of **Comau Adaptive Solutions** and **eComau**
成立柯马**通用工业事业部和绿色工程事业部**



2013

Comau China in expansion: 3 new sites
Kunshan, Shanghai, Dalian
柯马中国扩展：
3个新营业地
——**昆山、上海、大连**

2014

Comau Czech Thailand and Turkey are Established
Comau opens office in **Munich (D)**
Comau Mexico expansion
成立柯马**捷克、泰国和土耳其**公司
柯马在**德国慕尼黑**设立办事处
柯马**墨西哥**扩展

One team

40 years experience

一个团队

40年经验

4 innovation centers

15 manufacturing plants

4个创新中心

15个生产工厂

30 locations

17 countries

30个分部

17个国家

127 PMI® certified project managers

14,500 employees worldwide

127位PMI®注册项目经理

全球范围内**14,500**位员工

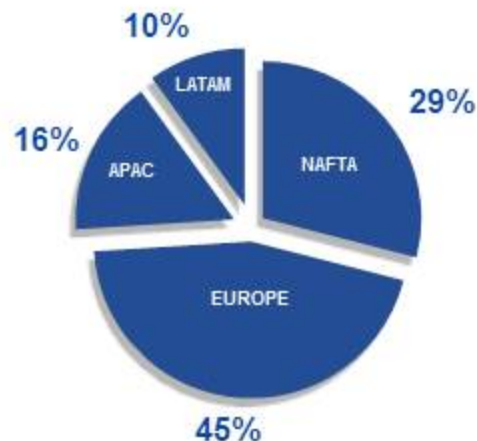
2012-14 Revenues (MIO €) – COMAU GROUP

2012-14年度柯马集团总收入(百万欧元)



2014 Turnover per area (%) – COMAU SYSTEMS

2014年度柯马系统各个区域的营业额





ComauFlex

A comprehensive, production proven, Flexible BIW manufacturing strategy, that is **solution-focused** as opposed to **component-driven**

It is state of the art, technologically evolving BIW solution that enables/addresses:

1. Multi-model manufacturing (cars, light trucks, SUVs, minivans)
2. Unique vehicle architectures (assembly sequence independent)
3. Diverse materials and joining methods (steel, light weight materials, ..)
4. Site Logistics constraints (engineered part feed and product assembly flow)
5. Light weight BIW building truss capacity
6. Compressed program timing (development, build, install)
7. Preferred build sequence (random or batch)
8. Scalable production volumes
9. Sub-assembly sourcing strategy (make or buy)
10. Any geographical region

What is COMAU FLEX ?

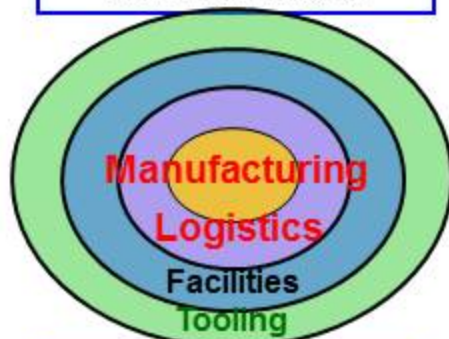
Flexible BIW manufacturing solution driven to meet strategic business objectives (cost reduction), not compromised by organizational, manufacturing engineering or commodity purchasing practices



COMAU FLEX

Organization Focused

Business Focused



FRAGMENTED

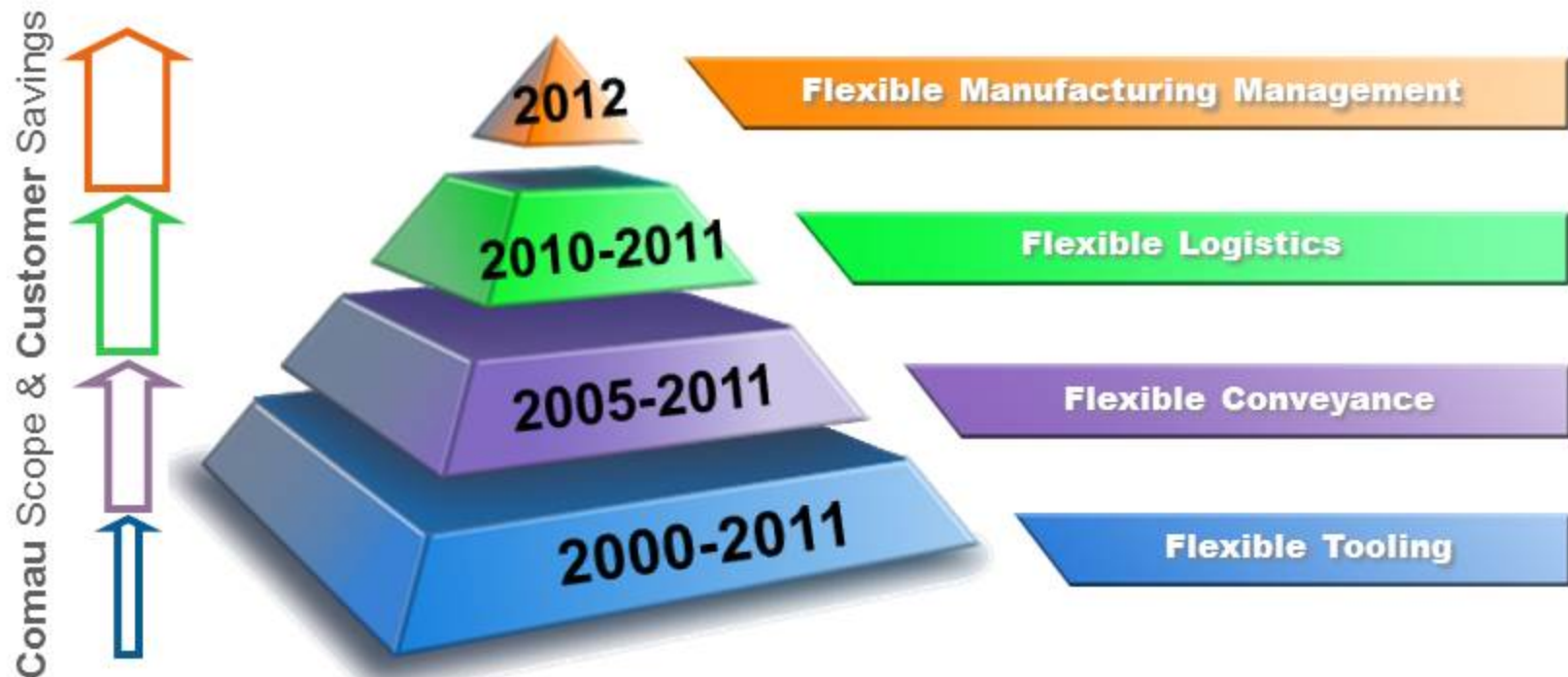
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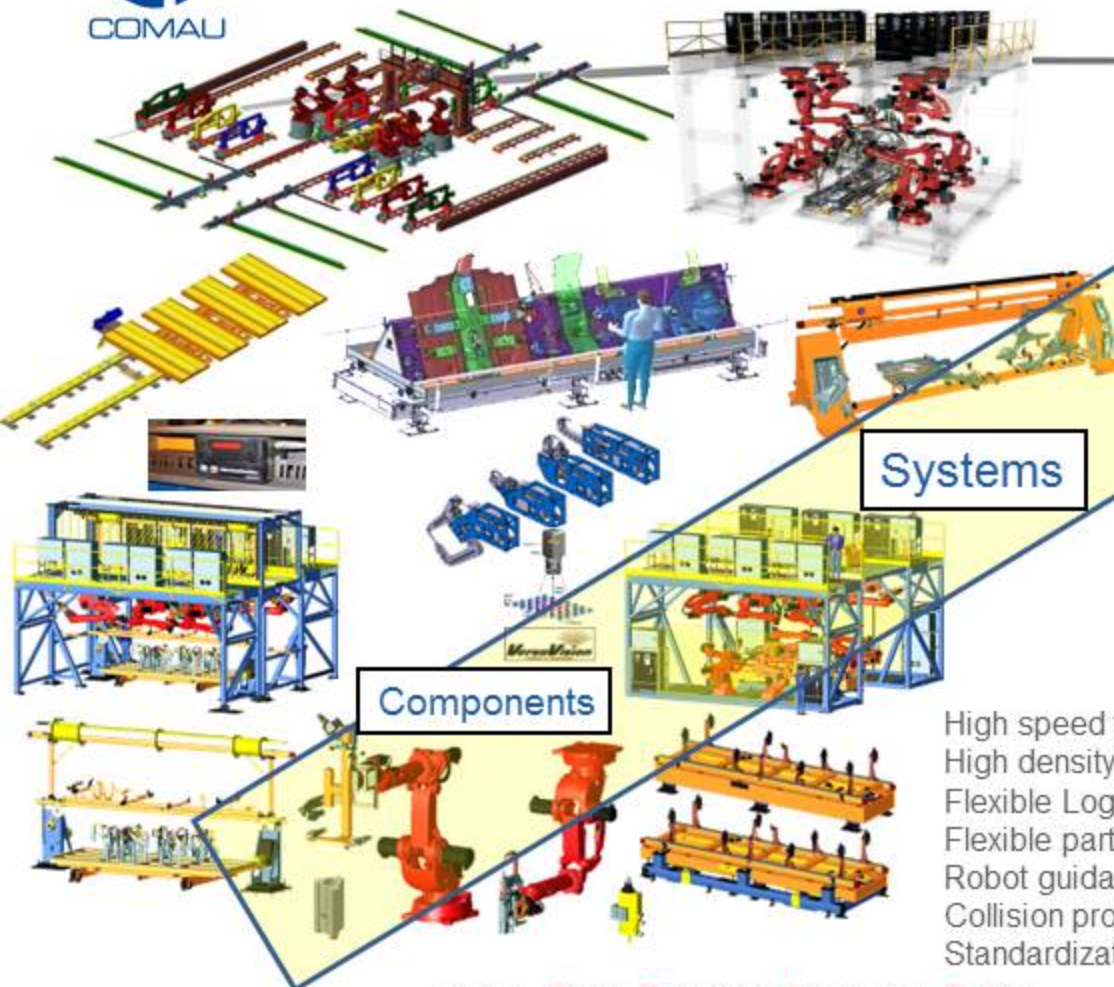
Customer Strategy – QDS

#	BIW Drivers Month/Dav/Year	RAT. INC.	GROUP
1	PRODUCT QUALITY	10	GROUP # 1 MANDATORY
2	THROUGHPUT	10	
3	RELIABILITY & MANTAINABILITY	9	
4	LINE FEEDING - MATERIAL FLOW	9	
5	ZERO LOSS LAUNCH	8	GROUP # 2 PREFERENTIAL
6	FLEXIBILITY- ARCHITECTURE	7	
7	FLEXIBILITY- RANDOM MIX	7	
8	PROVENTECHNOLOGY	6	
9	FLEXIBILITY-VOLUME	6	
10	EFFICENCY- WELD/TRANSFER TME	5	
11	INITAL TOOLING & FACILITIES COST	4	GROUP # 3 DESIRABLE
12	MODULARITY- STANDARDIZATION	4	
13	MODEL ADD COST	3	
14	FLOOR SPACE	2	
15	MODULARITY	1	
16	FACILITY CONSTRAINTS (Height, Pits)	0	

Video

COMAU *FLEX*





Components

Systems

Enablers

Solutions



COMAU FLEX

Enabling BIW Technologies

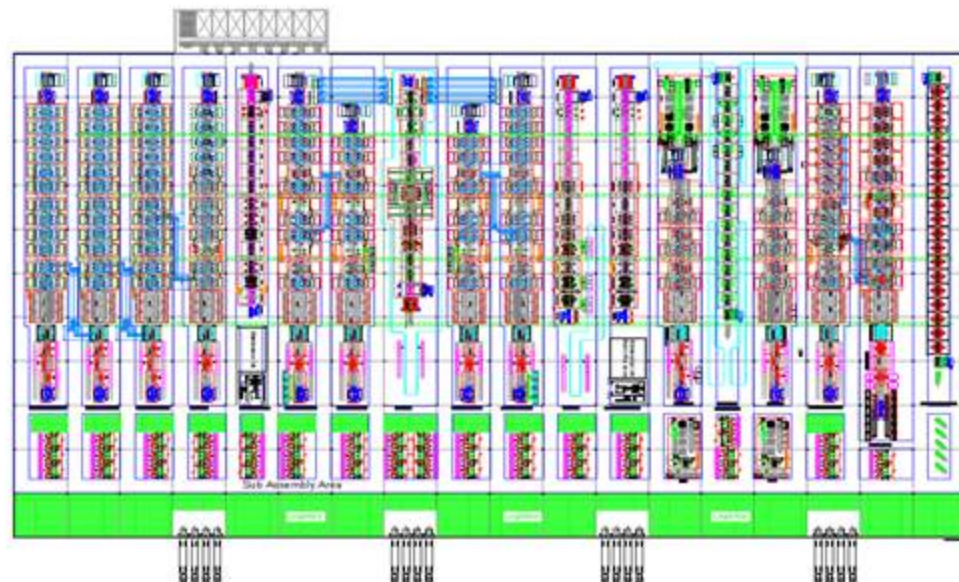
- High speed transfers - VersaCoder
- High density welding - BRIC with hollow wrist NJ robots
- Flexible Logistics - Sequence part delivery (SPD)
- Flexible part load - Comau machine vision, Gun-effector
- Robot guidance - RecogniSense
- Collision protection - Break-away and adaptable end-effector
- Standardization - VersaGuns, VersaShuttles, VersaPallet

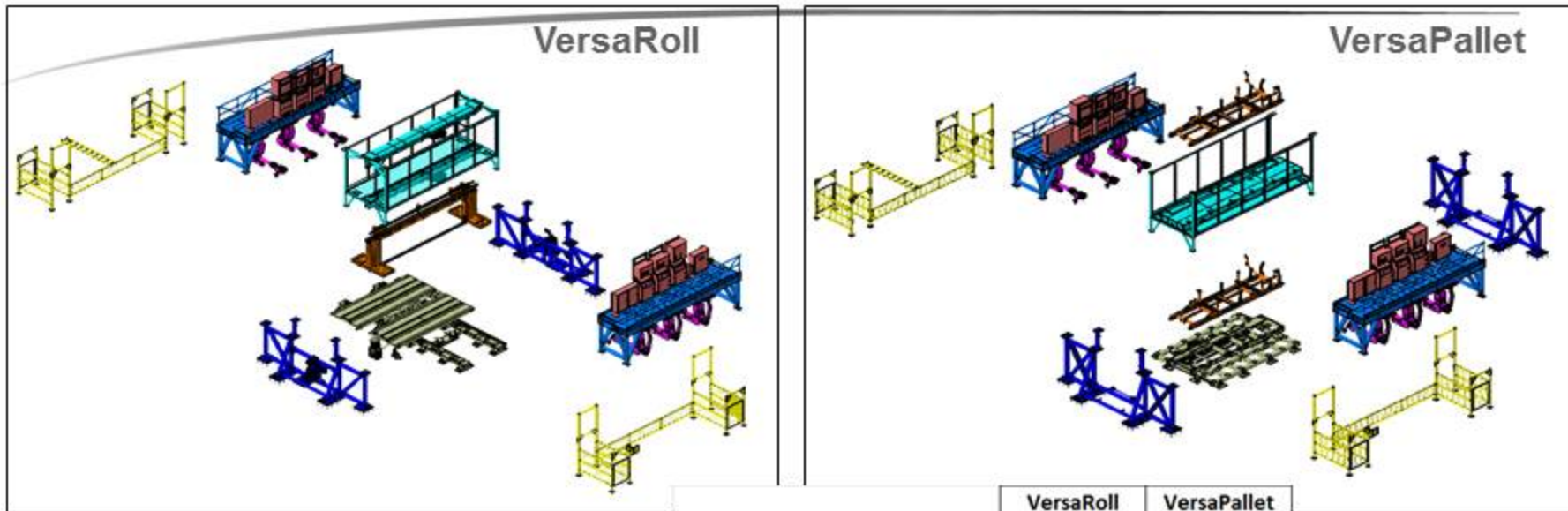
BRIC---Basic Robotized Integrated Cluster

Traditional Factory versus Engineered Factory



COMAU *FLEX*



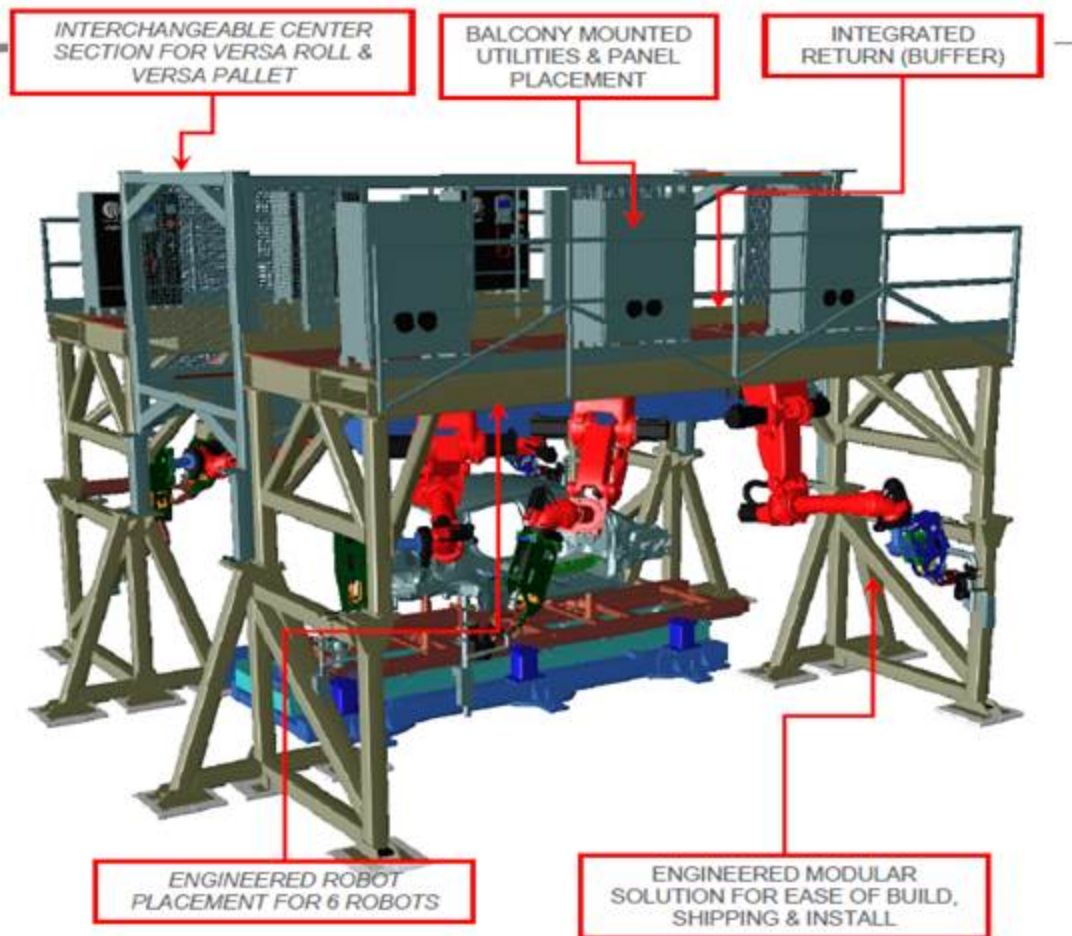


	VersaRoll	VersaPallet
Sub-assemblies	✓	
Engine Compartment Assembly	✓	
Centre Floor Assembly	✓	
Rear Floor Assembly	✓	
Underbody Geo-Assembly	✓	✓
Underbody Respot	✓	✓
Bodyside Inner Assembly	✓	
Bodyside Outer Assembly	✓	
Main Body Framing		✓
Main Body Respot		✓

BRIC Controls

Basic **R**obot **I**ntegrated **C**onfiguration

- Engineered pipe and wire
- Engineered cable lengths
- Engineered panel placement
- Engineered robot placement
- Engineered fume extraction
- Integrated power distribution
- Integrated fire protection
- Integrated station lighting
- Engineered ship and install



Optical Reader



ID Code Rail





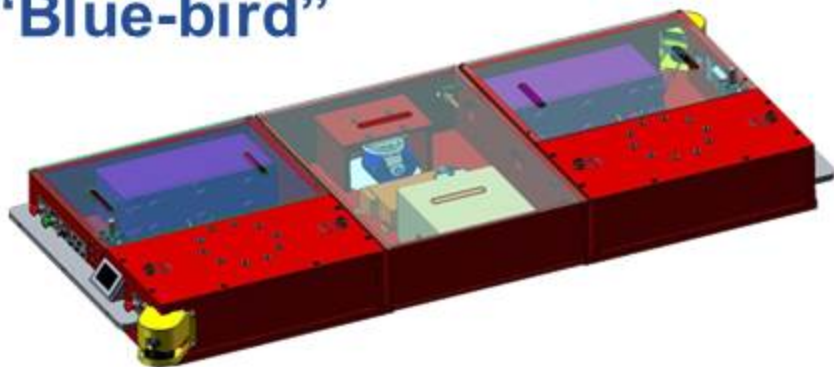
Cabinets eliminated.

- reduced hardware, reduced wiring, reduced space required, reduced installation time.

“Bagel”

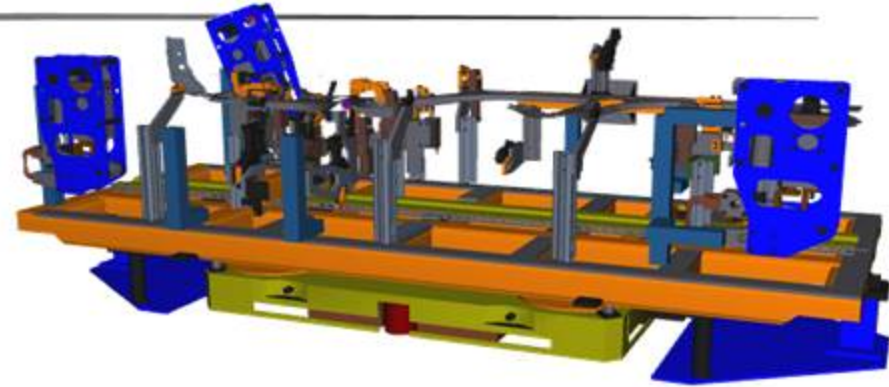
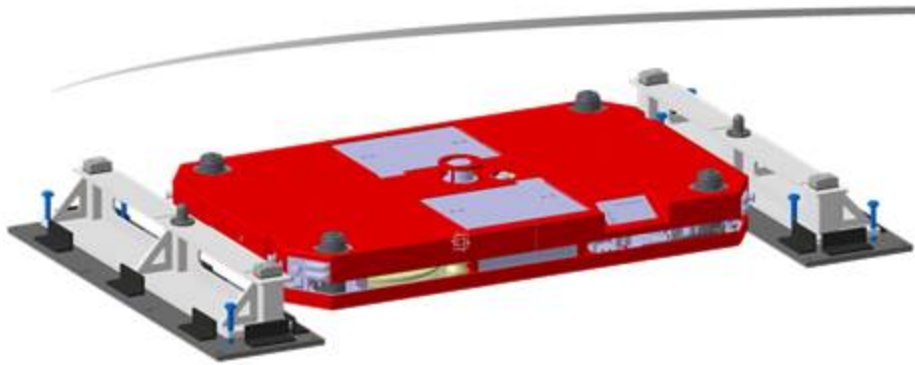


“Blue-bird”

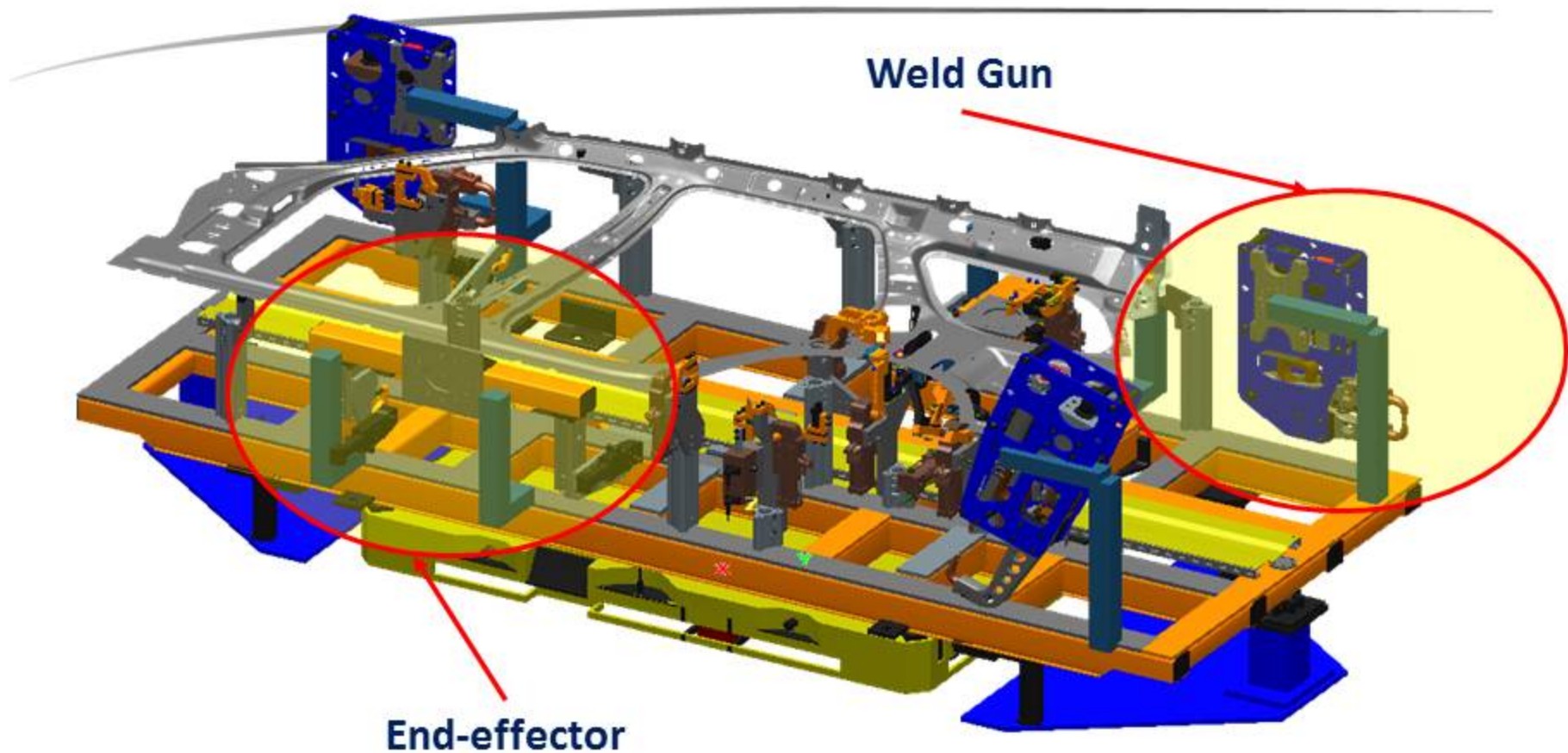


“VersaMover”

VersaMover Tool Tray Exchange



1. Geo Tool-tray replacement method
2. Enables model specific End-effector replacement
3. The "Random Block" build
4. Enables 24/7 tool maintenance
5. No shuttles required for new model introduction
6. Enables unique product architecture build
7. Enables prototype build in production systems
8. Enhances system performance (R&M) and enables Gross speed reduction
9. Reduces Initial investment and life cycle cost





Open Robogate

New Open Robogate - System Hardware

Video

- System shown with 12 robots





Compact Gun

Compact Gun

Size :

- X-gun (577 mm x 425 mm x 150 mm)
- C-gun (640 mm x 425 mm x 150 mm)

Weight :

- From 65 Kg to 90 Kg

Welding force

- 440 daNm for X-Gun
- 700 daN for C-Gun

Transformer

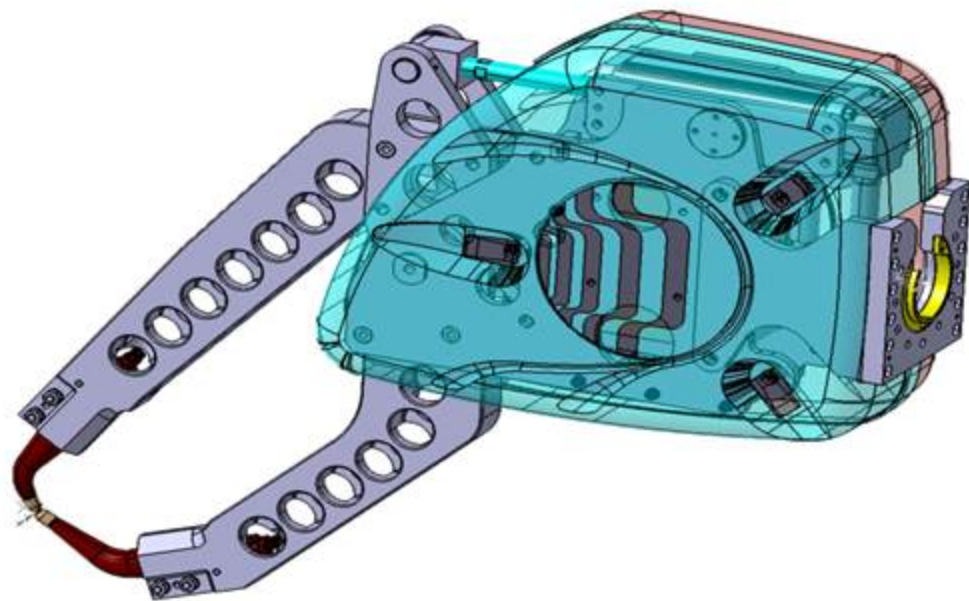
- DC (91 KVA 50%)

Actuator (Inverted roller screw)

- 1764 daN for X-Gun
- 882 daN for C-gun

Equalizing

- Software





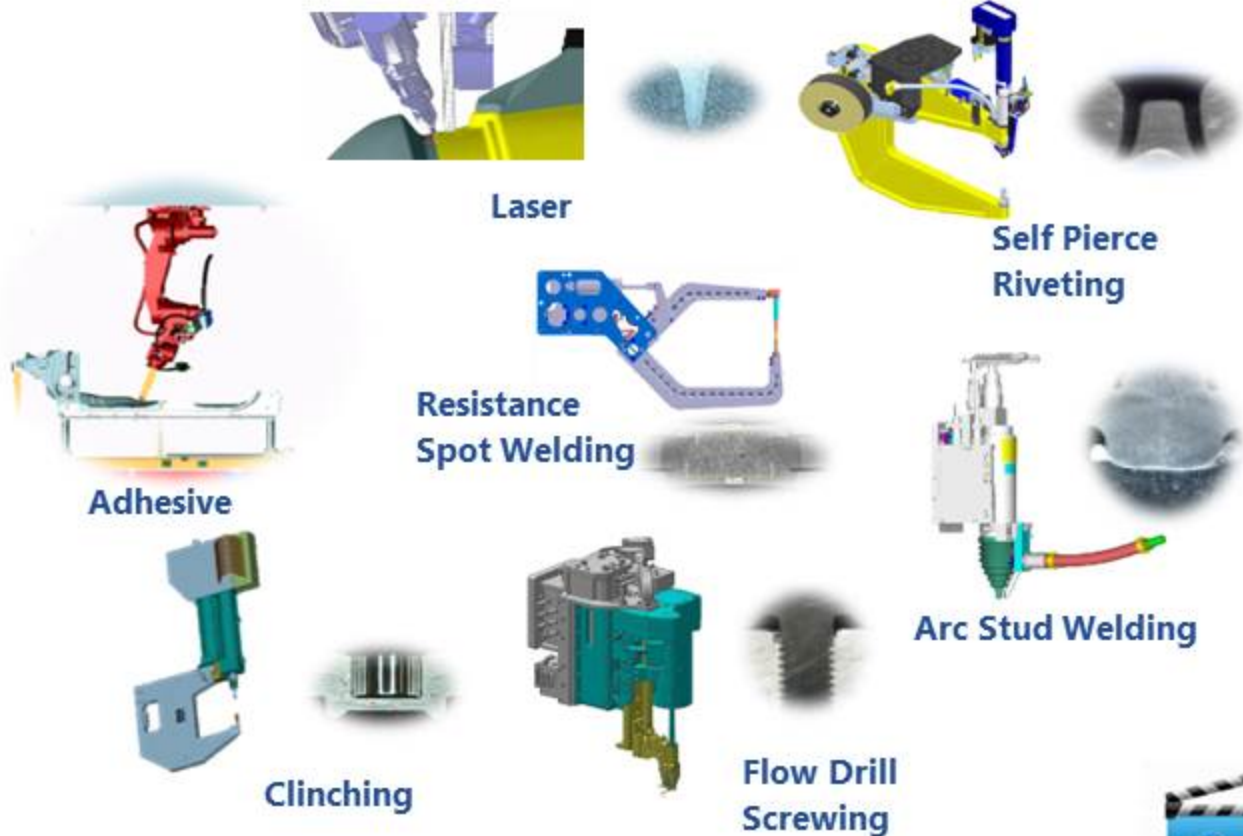
Aluminium Joint Technology

Light Weight Materials

- Aluminum
- Hybrid Materials
- Magnesium
- Composites
- Plastic
- Steel

Steel Variants

- High Strength Steel
- BH- Steel
- CP- Steel
- DP- Steel
- Trip Steel



Video

