Project „Flexible Assembly Processes for the Car of the Third Millennium (MyCar)"
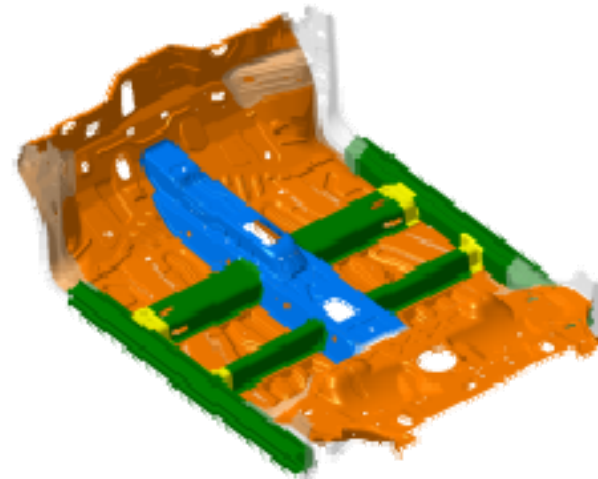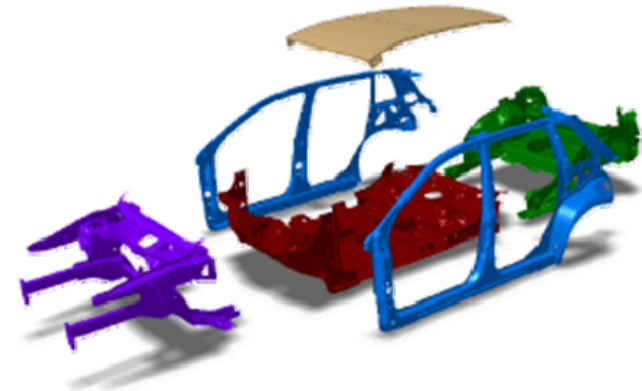
Problem Description (High Level)
Intelligent Tool for Adaptable Assembly Line Design and Operation

Problem Definition

■Automotive industry – Current state

• Complex Product Structure

•Large number of components

•Different lines designed for subassemblies of the same product

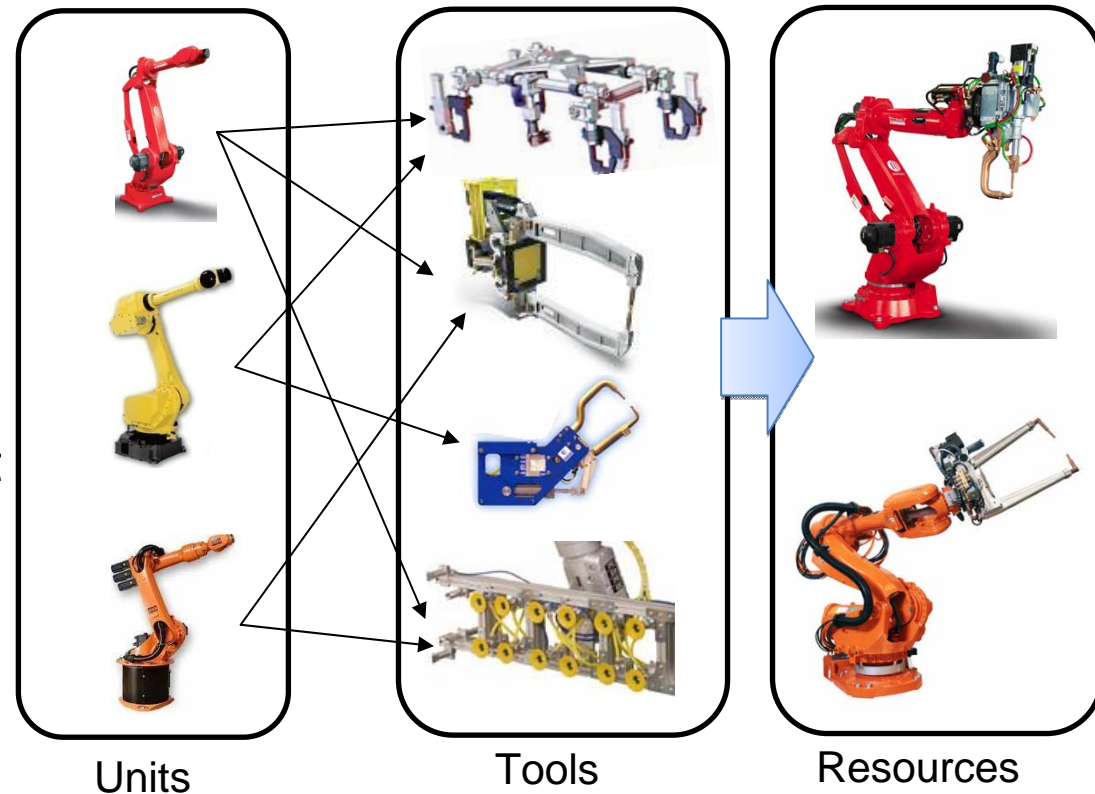# Problem Definition

■Automotive industry – Current state

• Large number of joining technologies

• New innovative processes and materials appear

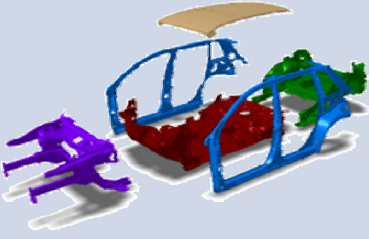• New line configurations become feasible

Problem Definition

▪Automotive industry – Current state

•Many different equipment providers

• Large number of equipment available for realizing the joining technologies

•Equipment presents different technical characteristics that affect line performance (reliability, cost etc)

Units   Tools   Resources

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Problem Definition

In the early design stages the following data are available

Product Specifications And Assembly Sequence	Required Assembly Process specifications	Available (owned & market) resources specifications	User defined performance indicators
		•Inv. Cost •MTBF •MTTR •Owned quantity •Compatible tools	- Total Inv. Cost - Line Availability - Equip. Reutilization - Flexibility - Annual production rate - Other user defined…

The challenge is to:

"Derive an assembly line design / configuration (alternative) that can produce the specified product and satisfy the user defined criteria"

Problem Definition

■Identified challenges

Complex product structure – number of components

↓ In combination with

Large number of available processing technologies

↓ In combination with

Large Number of resources offered by equipment providers

↓ Results in

Vast number of feasible assembly line designs

Early design stages – few data available

↓ And therefore

Results depend on experts' know how

↓ Who lack IT support since

Existing tools are used for documentation

↓ And have

Limited or no capabilities for generating and evaluating new alternative designs

↓ Therefore ↓

Human Designer cannot handle complexity – Support needed in the design phase