

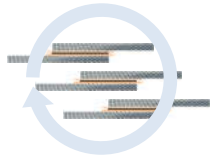
Towards Industrial Welding of Thermoplastic Composites for Full Scale Applications



Knowledge for Tomorrow



➔ ***RPB Fast Lane Project***



➔ **Welding Activities at DLR**



Knowledge for Tomorrow



RPB Fast Lane Project

A close-up photograph of a metallic, curved surface, likely a part of an aircraft or spacecraft. The surface is dark grey or blue and has a circular hole in the center. The lighting creates highlights and shadows, emphasizing the curvature and texture of the material.

Knowledge for Tomorrow



RPB Fast Lane Project

Question 1 of 3: What are the reasons for our participation?



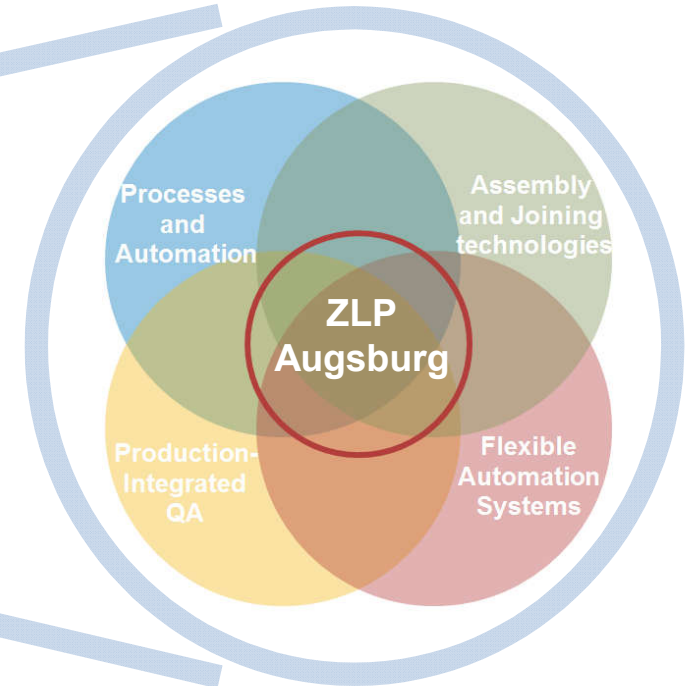
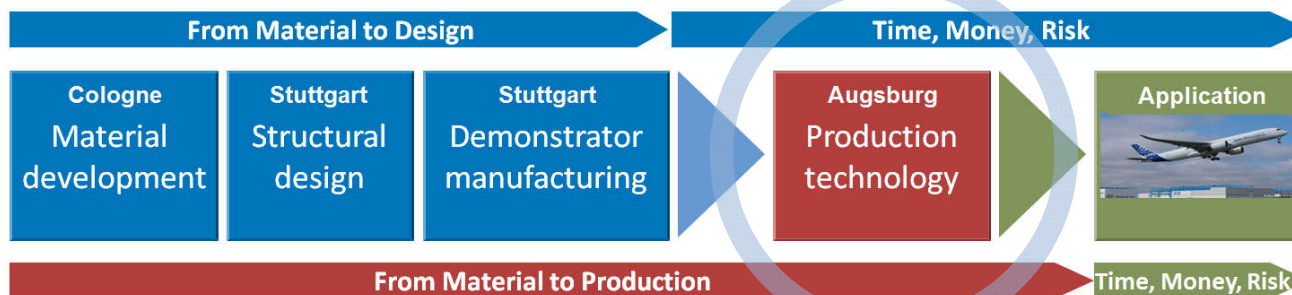
Knowledge for Tomorrow



RPB Fast Lane Project

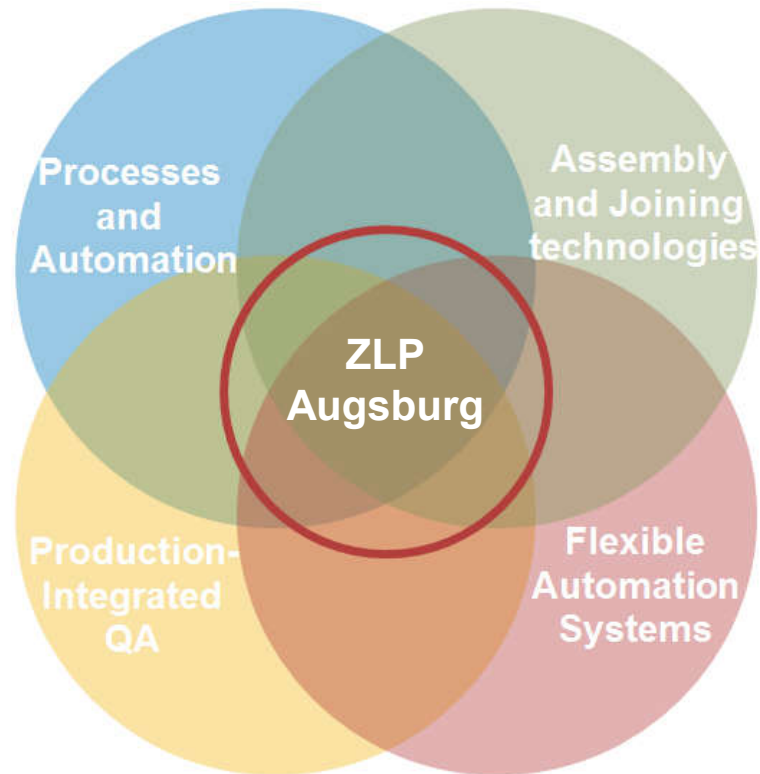
Question 1 of 3: What are the reasons for our participation?

Our fitting focal points:





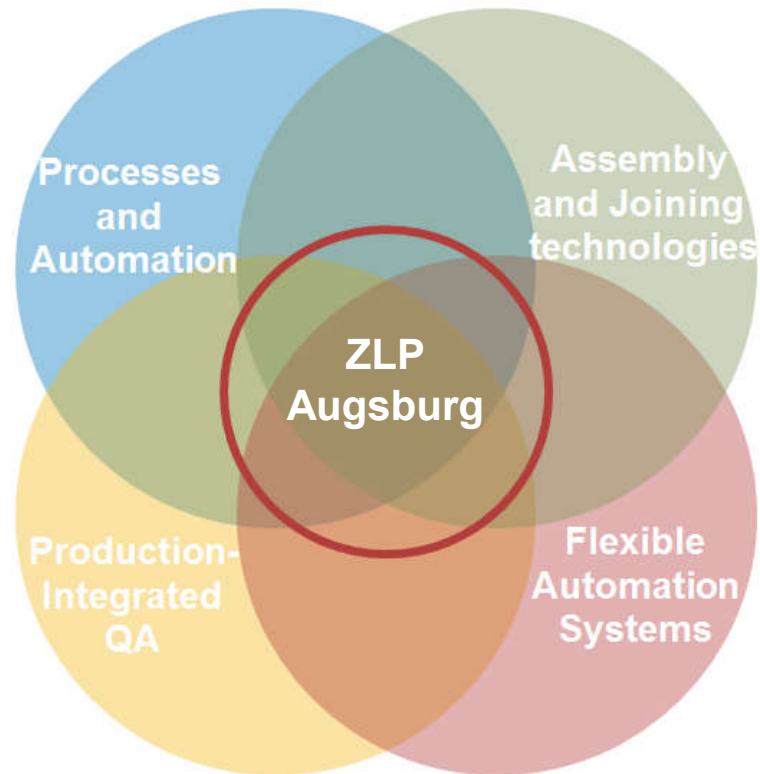
RPB Fast Lane Project





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**Question 2 of 3:
How can we master the
project challenges?**

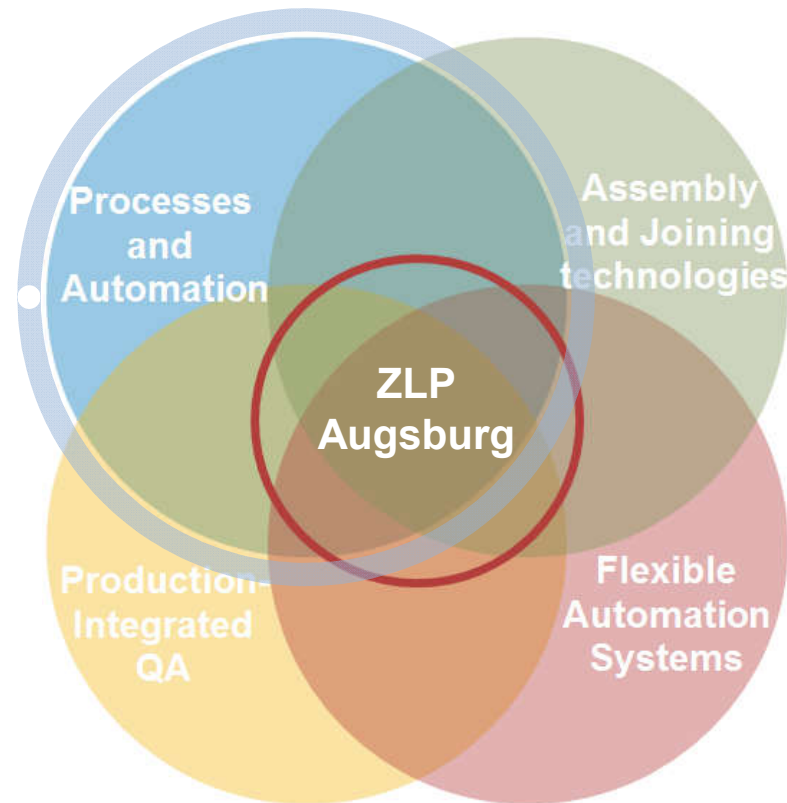




RPB Fast Lane Project

Question 2 of 3:
How can we master the
project challenges?

Thermoforming of composite
laminates under consideration
of industrialization

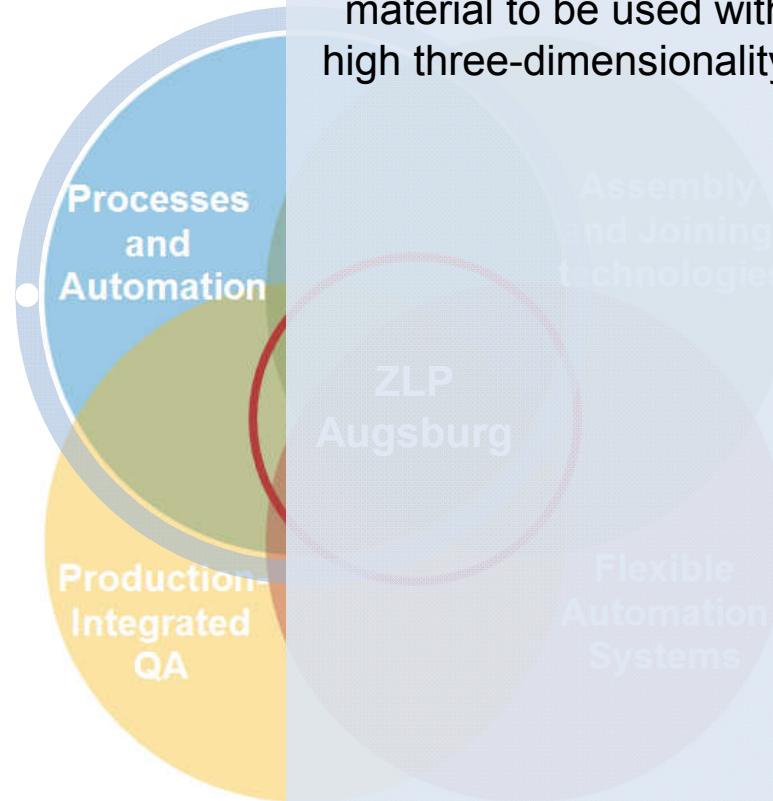




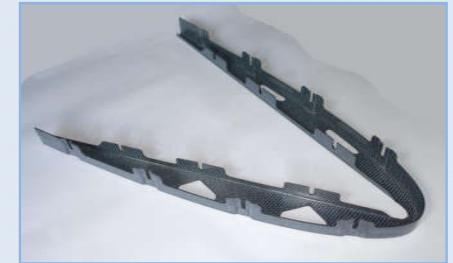
RPB Fast Lane Project

Question 2 of 3:
How can we master the
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Thermoforming of composite
laminates under consideration
of industrialization



Processability of the
material to be used with
high three-dimensionality

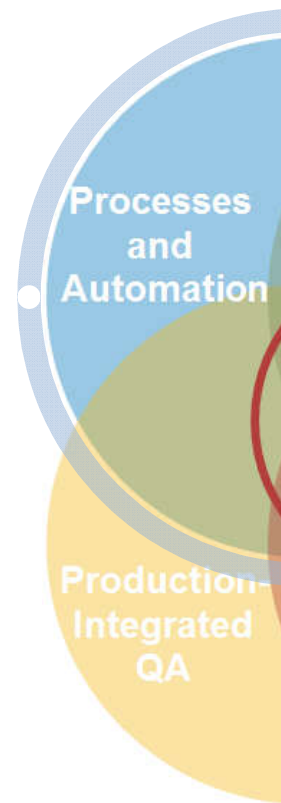




RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

Thermoforming of composite laminates under consideration of industrialization



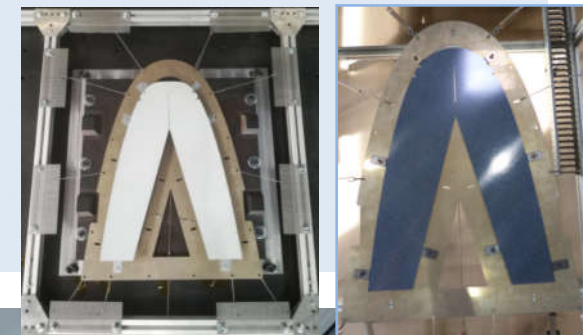
Processability of the material to be used with high three-dimensionality



Recording of all process-relevant data

HeiBstrahl-Oben	HeiBstrahl-Unten
4.0	27
4.0	28
4.0	29
4.0	30
4.0	31
4.0	32
4.0	33
4.0	34
4.0	35
4.0	36
4.0	37
4.0	38
4.0	39
4.0	40
4.0	41
4.0	42
4.0	43
4.0	44
4.0	45
4.0	46
4.0	47
4.0	48
4.0	49
4.0	50
4.0	51
4.0	52
4.0	53
4.0	54
4.0	55
4.0	56
4.0	57
4.0	58
4.0	59
4.0	60
4.0	61
4.0	62
4.0	63
4.0	64
4.0	65
4.0	66
4.0	67
4.0	68
4.0	69
4.0	70
4.0	71
4.0	72
4.0	73
4.0	74
4.0	75
4.0	76
4.0	77
4.0	78
4.0	79
4.0	80
4.0	81
4.0	82
4.0	83
4.0	84
4.0	85
4.0	86
4.0	87
4.0	88
4.0	89
4.0	90
4.0	91
4.0	92
4.0	93
4.0	94
4.0	95
4.0	96
4.0	97
4.0	98
4.0	99
4.0	100

Process mastery and optimization within two weeks

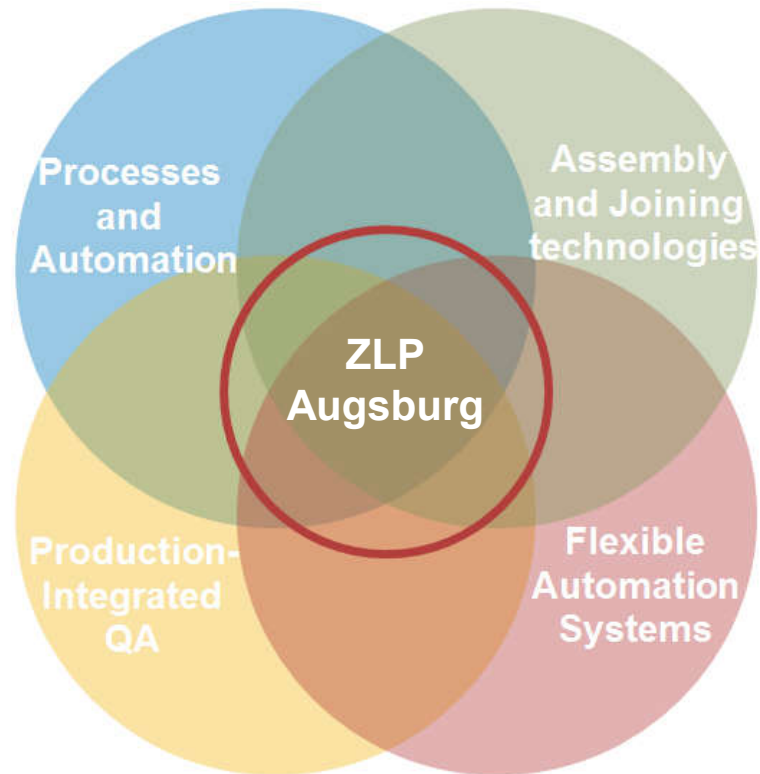




RPB Fast Lane Project

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Thermoforming of composite
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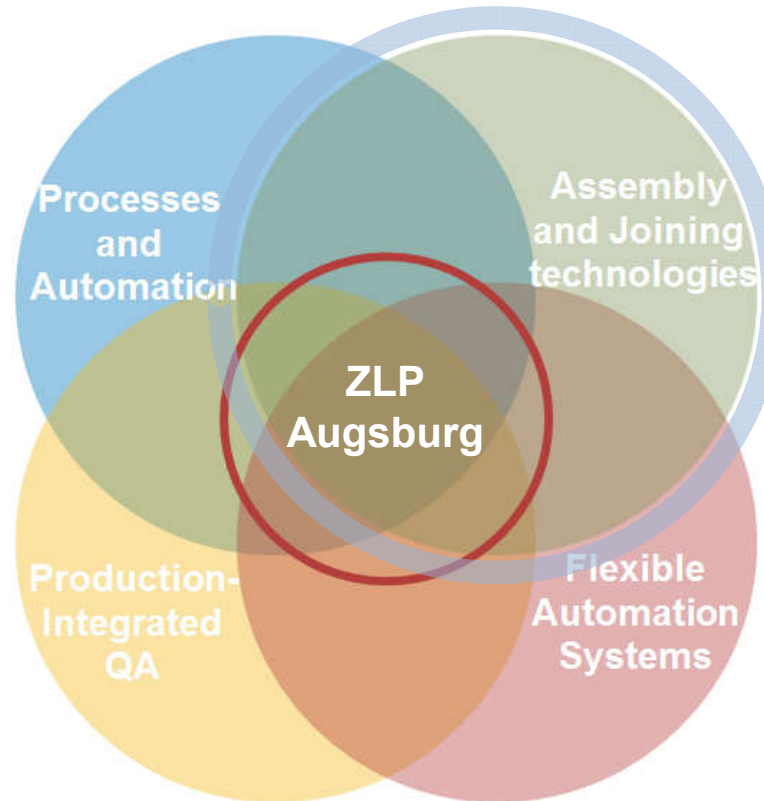




RPB Fast Lane Project

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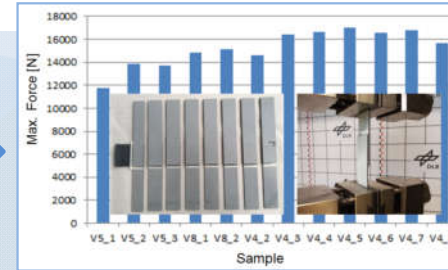
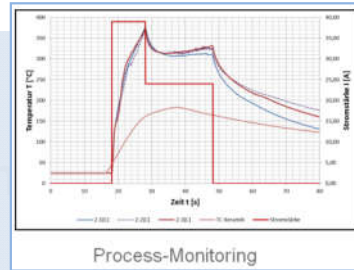


Developing of the
welding technology for
structural parts

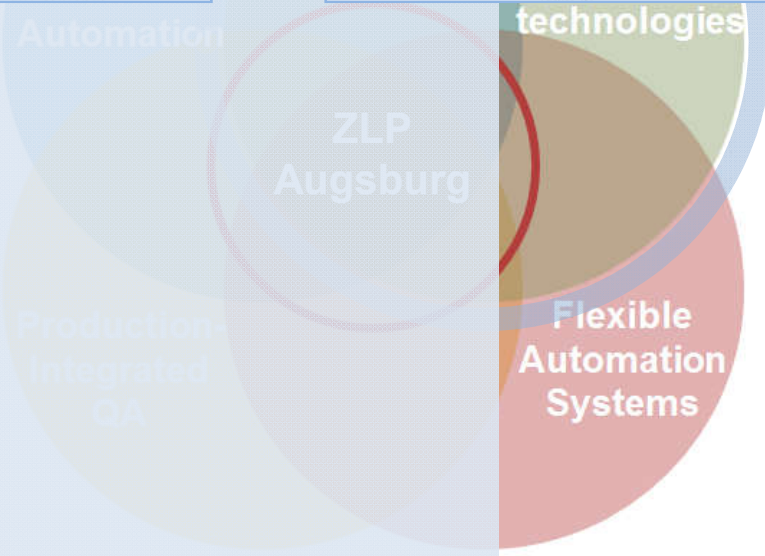


RPB Fast Lane Project

Developing a stable resistance welding process on a small scale



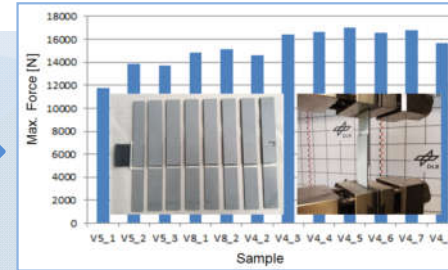
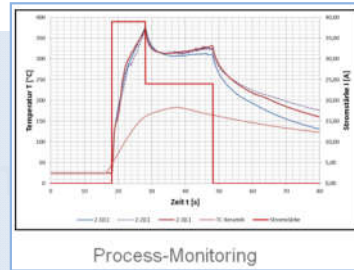
Developing of the welding technology for structural parts





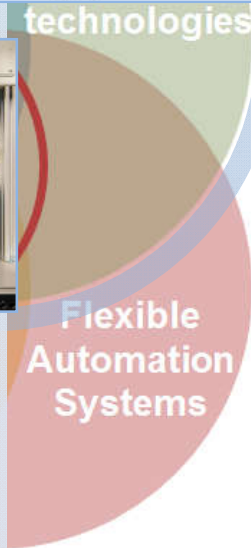
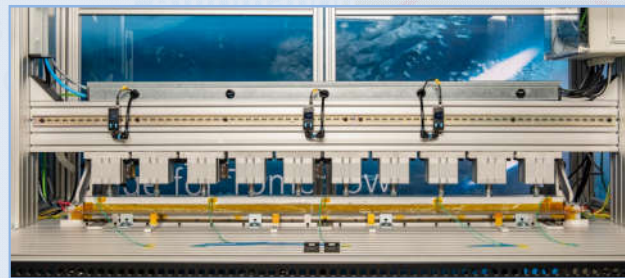
RPB Fast Lane Project

Developing a stable resistance welding process on a small scale



Developing of the welding technology for structural parts

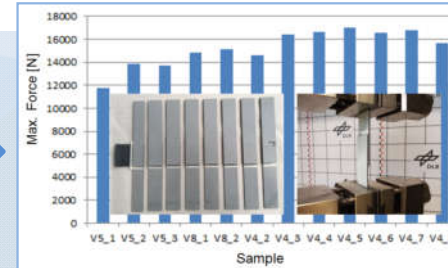
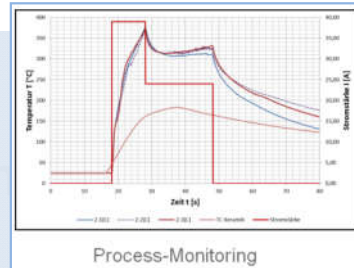
Prove feasibility of the upscale





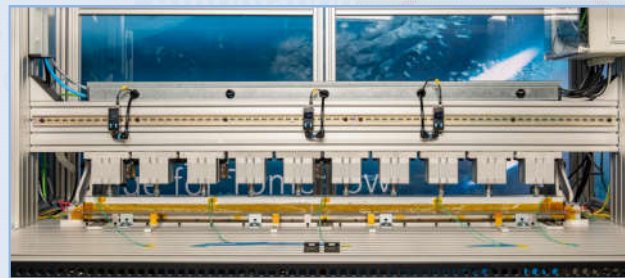
RPB Fast Lane Project

Developing a stable resistance welding process on a small scale



Developing of the welding technology for structural parts

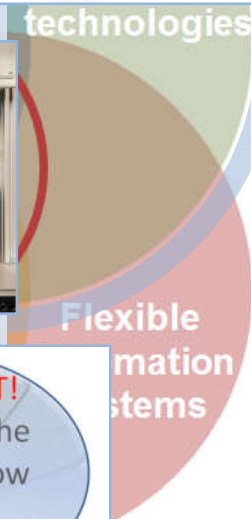
Prove feasibility of the upscale



Join of two different rear pressure bulkhead demonstrators



TOP SECRET!
See you at the Paris Air Show 2019 in Le Bourget

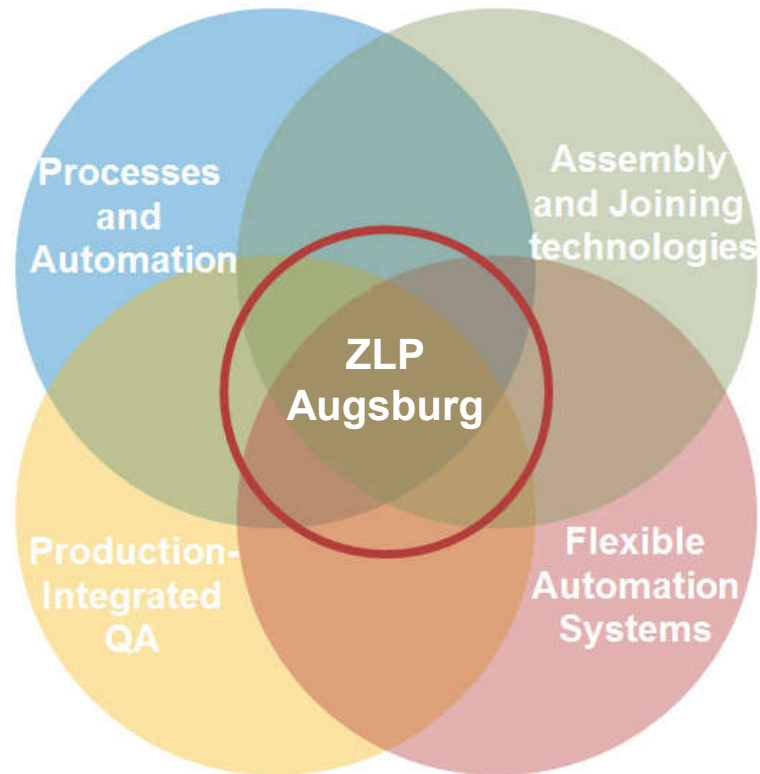




RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

Thermoforming of composite laminates under consideration of industrialization



Developing of the
welding technology for
structural parts



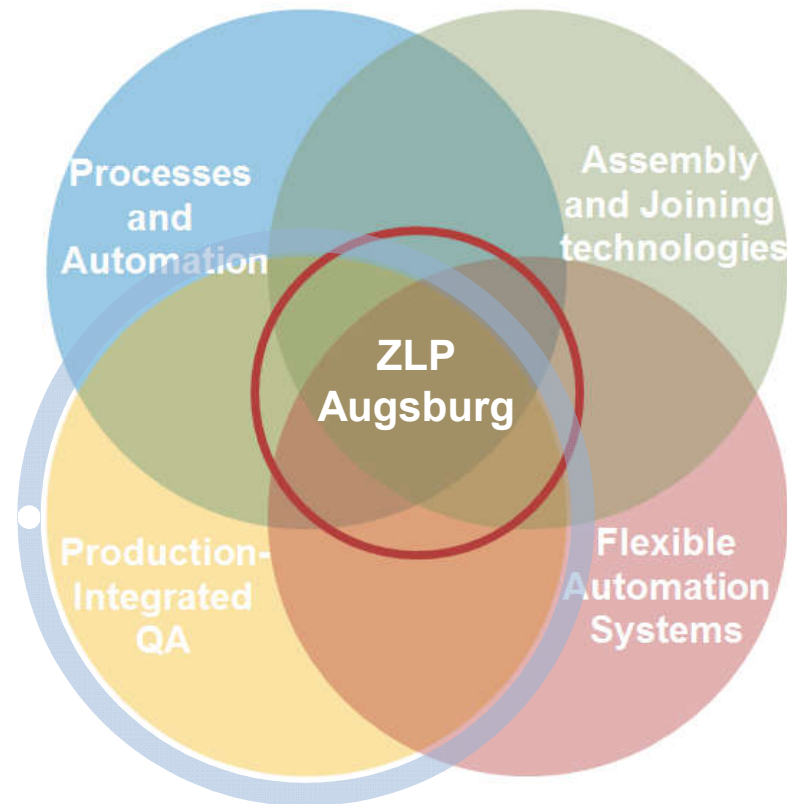
RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

Thermoforming of composite laminates under consideration of industrialization

Integration of **measuring equipment**

Qualification of **non-destructive testing methods**



Developing of the **welding technology** for structural parts



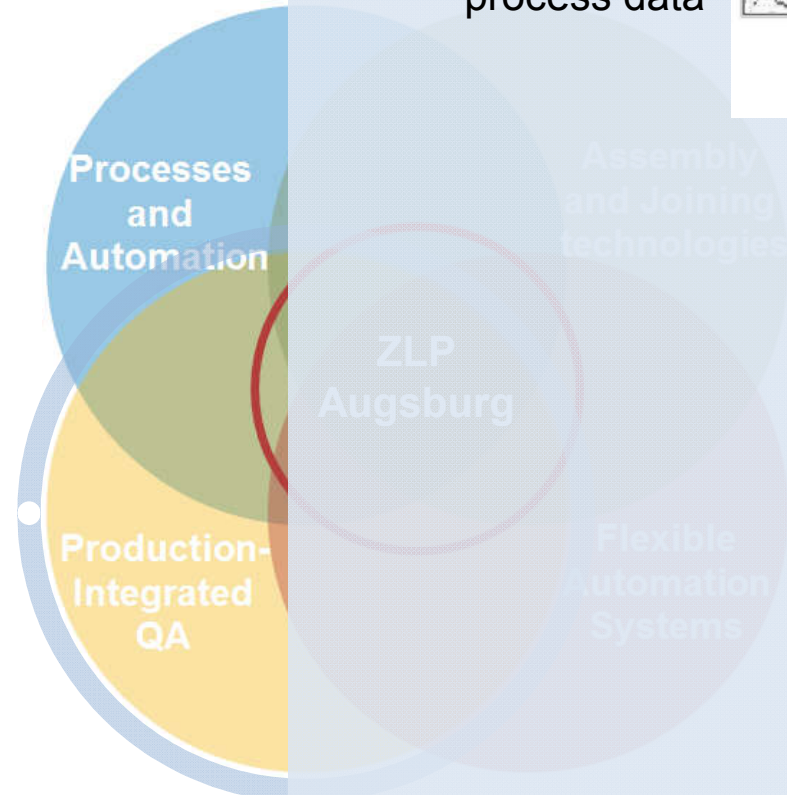
RPB Fast Lane Project

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How can we master the project challenges?

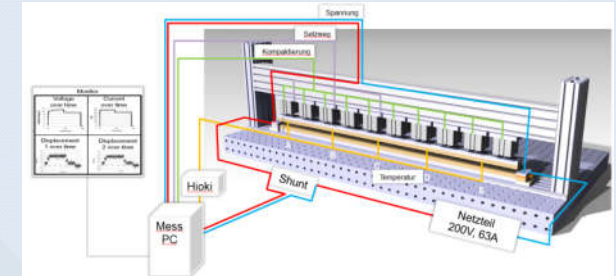
Thermoforming of composite laminates under consideration of industrialization

Integration of **measuring equipment**

Qualification of **non-destructive testing methods**



Recording process data





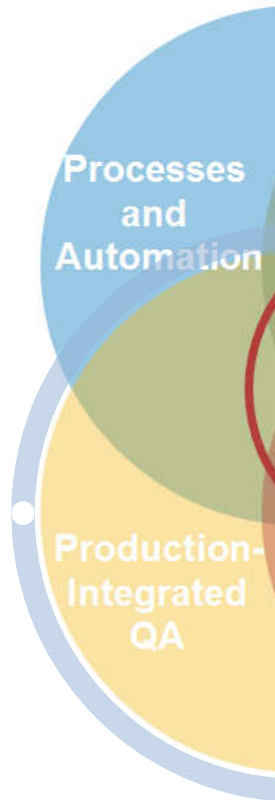
RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

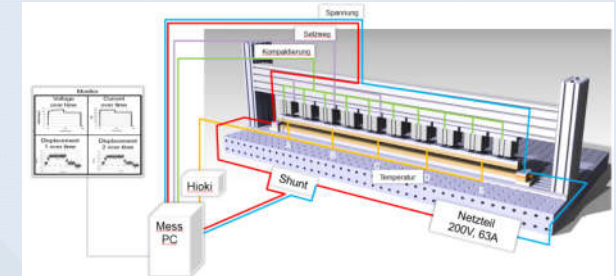
Thermoforming of composite laminates under consideration of industrialization

Integration of **measuring equipment**

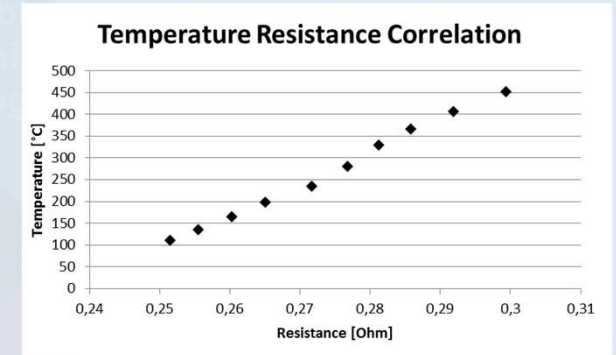
Qualification of **non-destructive testing methods**



Recording process data



Determination of process variables and relationships





RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

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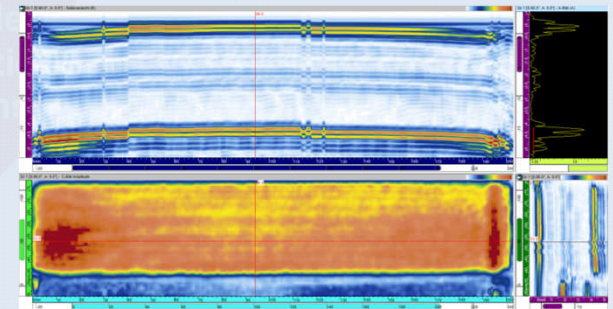
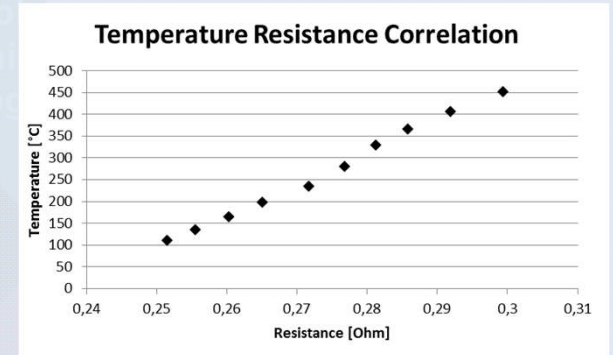
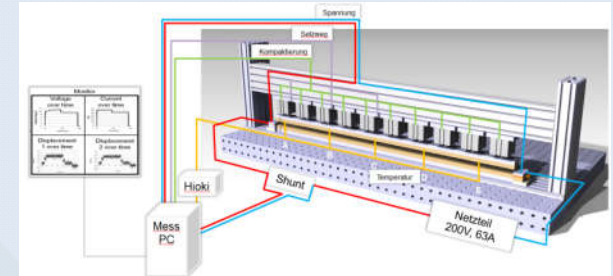
Processes and Automation

Production-Integrated QA

Determination of process variables and relationships

Identification of suitable nondestructive testing methods

Recording process data





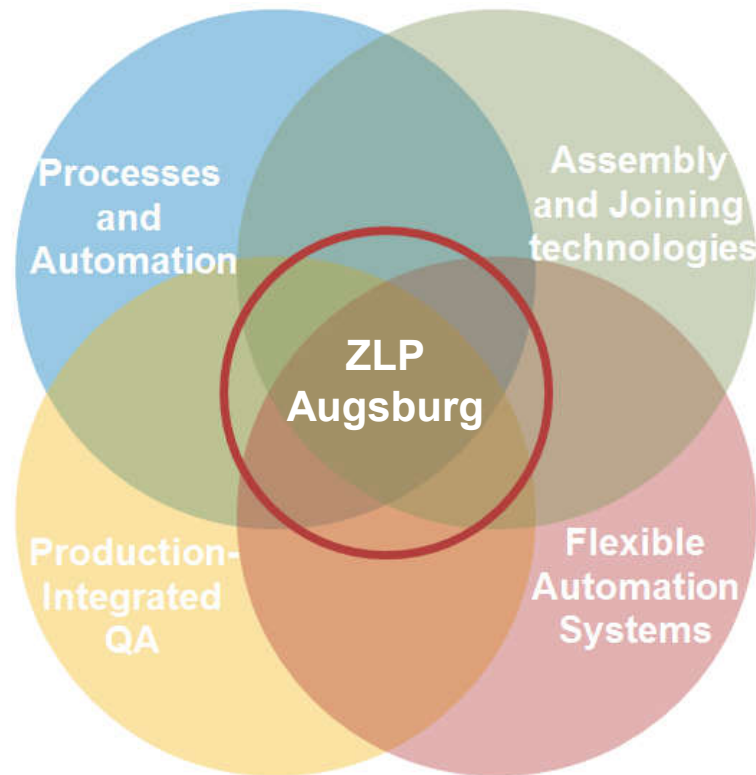
RPB Fast Lane Project

Question 2 of 3: How can we master the project challenges?

Thermoforming of composite laminates under consideration of industrialization

Integration of measuring equipment

Qualification of non-destructive testing methods



Developing of the welding technology for structural parts



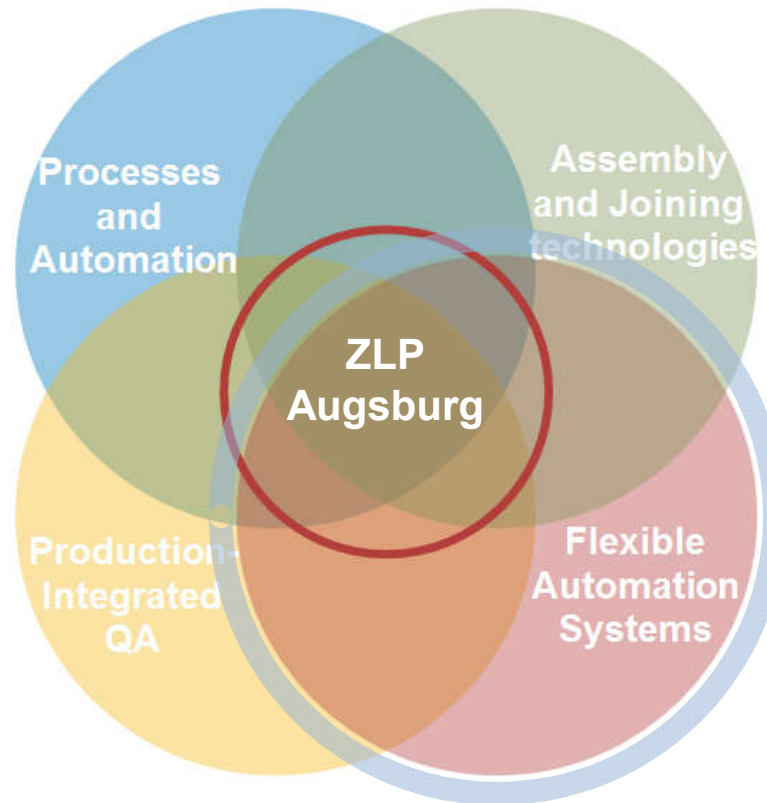
RPB Fast Lane Project

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Thermoforming of composite laminates under consideration of industrialization

Integration of measuring equipment

Qualification of non-destructive testing methods



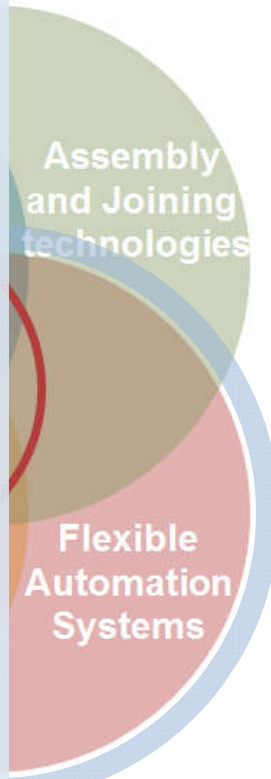
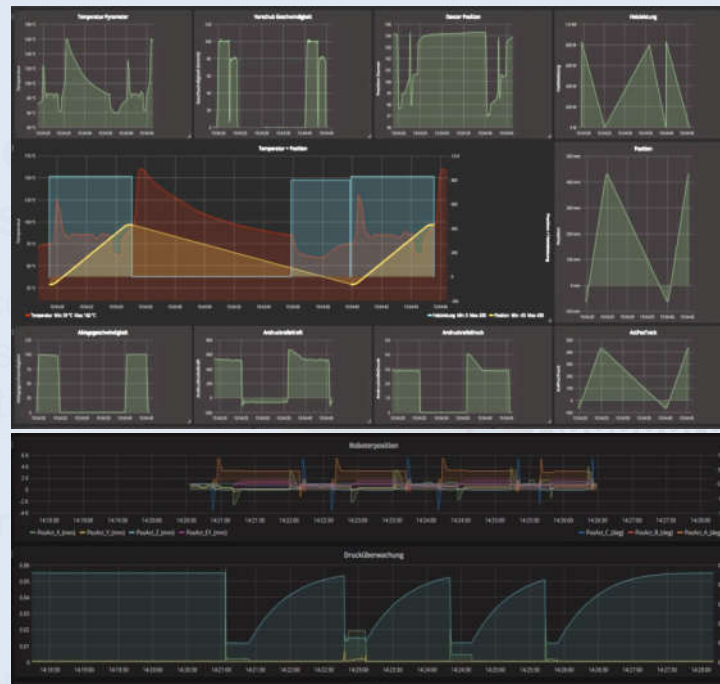
Developing of the welding technology for structural parts

Process data acquisition and further usage



RPB Fast Lane Project

Automatically saving of time series



Developing of the welding technology for structural parts

Process data acquisition and further usage

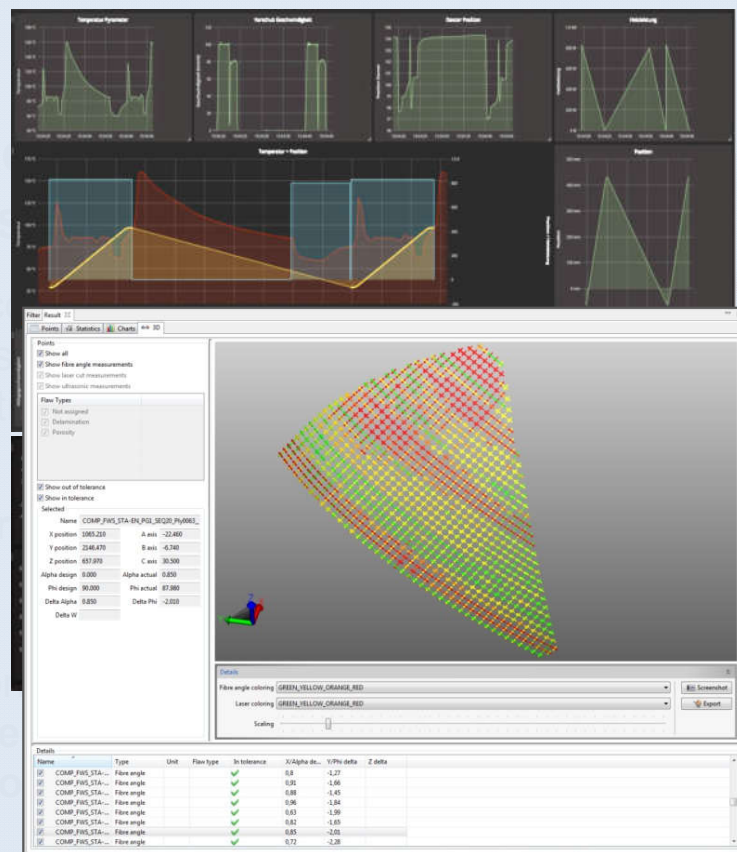




RPB Fast Lane Project

Automatically saving of time series

Transfer of local resolvable data to a digital model



Developing of the welding technology for structural parts

Assembly and Joining technologies

Flexible Automation Systems

Process data acquisition and further usage





RPB Fast Lane Project

Question 3:





RPB Fast Lane Project

Question 3: How does a rear pressure bulkhead welding look like?





RPB Fast Lane Project

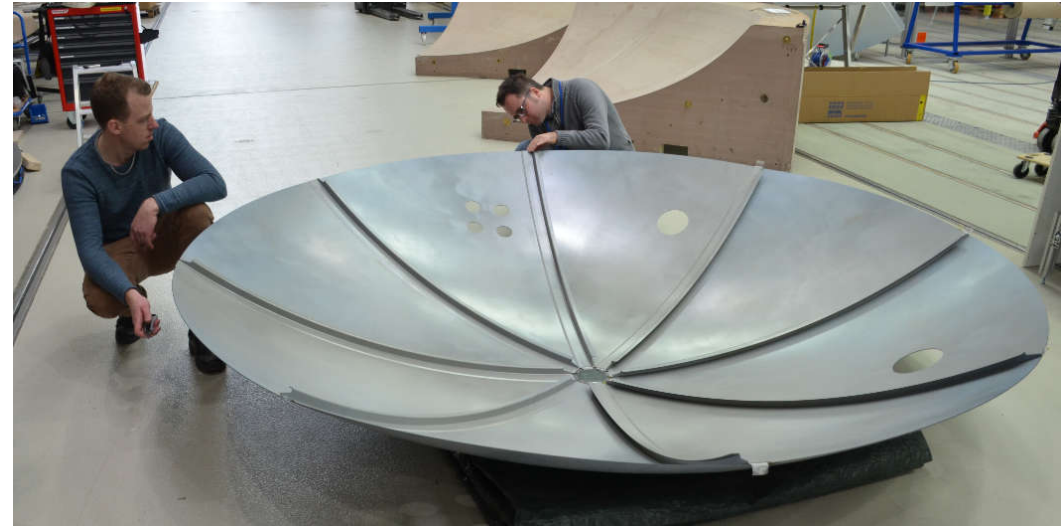
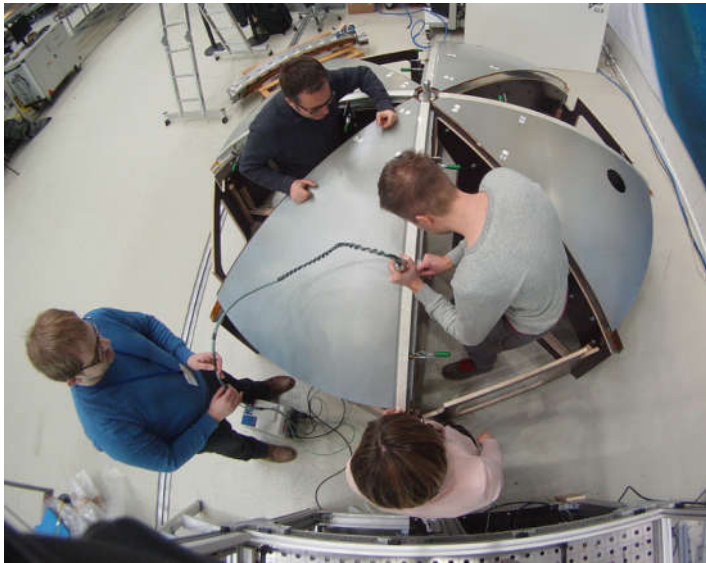
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RPB Fast Lane Project

Thanks for your ongoing attention!



Knowledge for Tomorrow