



FUTURE REPAIR AND MAINTENANCE  
FOR AEROSPACE INDUSTRY

---

**Deliverable 2.5**

**Draft of production, supply chain and  
workflow requirements specifications and  
process control system**

Final

---

Marco Plaß

Benedikt Wübbecke

University of Paderborn

December 2013

Work Package 2

Project Coordinator

Prof. Dr.-Ing. Rainer Koch (University of Paderborn)

7th Framework Programme

for Research and Technological Development

COOPERATION

AAT2013.4-4.: Maintenance, repair and disposal



Distribution level		Public		
Due date		30/11/2013		
Sent to coordinator		13/12/2013; 13.01.2014, 11.04.2014		
No. of document		D2.5		
Name		<i>Draft of production, supply chain and workflow requirements specifications and process control system</i>		
Type				
Status & Version		1.9		
No. of pages		51		
Work package		2		
Responsible		<i>University of Paderborn</i>		
Further contributors		<i>Sebastian Schöttler, University of Paderborn (Ch. 2)</i> <i>Luis Portolés Griñán, AIMME (Ch. 2.3 &amp; 3.1)</i> <i>Philipp Reipschläger, Lufthansa Technik (Ch. 3.1, 3.3 &amp; 4.1)</i> <i>Several interview partners, Lufthansa Technik (Ch. 4.1, 4.3, 4.6 &amp; 6)</i> <i>Most of the project participants (Ch. 4.8.1)</i> <i>Dieter Schwarze, SLM Solutions (Ch. 4.8.4)</i>		
Authors		<i>Marco Plaß, University of Paderborn</i> <i>Benedikt Wübbeke, University of Paderborn</i>		
Keywords		<i>Requirements, MRO processes</i>		
Short description		<i>This document subsumes the efforts conducted for collecting requirements on the RepAIR production platform. It already contains first results. The efforts will be continued and lead to the upcoming deliverable D2.6.</i>		
History	Version	Date	Author	Comment
	V1.0	18/10/2013	UPB	Initial Version

	V1.1	21/10/2013	UPB	BPA&M added
	V1.2	31/10/2013	UPB	Revision and extension, chap. 2/3/4
	V1.3	04/11/2013	UPB	Update of chapter 4.1
	V1.4	08/11/2013	UPB	Reviewed and Revised
	V1.5	14/11/2013	UPB	Draft of tree of goals added
	V1.6	21/11/2013	UPB	Integrated comments from MRO and QA review, extended the results part
	V1.7	29/11/2013	UPB	Minor changes due to QA review
	V1.8	13/01/2014	UPB	Minor changes in contribution list
	V1.9	11/04/2014	UPB	Added management summary

***The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n°605779.***

## Executive summary

As the RepAIR consortium consists of different types of organizations in different fields of activity (MRO, research, production technology etc.) the participants implicitly do not share the same mental model. Because of different backgrounds, experiences and educations there is a gap in understanding the needs of each other partner.

To synchronize demands of MRO service providers and from OEMs of aircrafts with project goals, the consortium needs a complete list of reasoned requirements on entities developed within the project. The benefit for the continuing work in WP3, WP4, WP5, WP6, WP7 and WP8 is obvious. Therefore, results described in this document will support overall objectives 1, 2, 4, 5 and 7.

This document comprises the methodological approach for gathering requirements on the one hand and the procedure for specifying one joint repair and production process for the three considered additive manufacturing technologies on the other hand (a.k.a. production platform).

Prior to gather requirements, a business process analysis on MRO processes has been conducted. Business processes of MRO service providers have been modeled on the basis of literature review and interviews. This includes models of an embarked aircraft having trouble with a malfunctioning assembly, the disembarkment and replacement of the assembly on the ramp, the disassembly and repair in a workshop, the reassembly and certification and finally the reinstallation into an airworthy aircraft.

The following integration of the new repair and production process lead to rearranged business processes.

Knowing the context of the new repair and production process, a requirement analysis has been started. The approach has been conducted following the IREB standard (International Requirement Engineering Board).

The context has been analyzed, relevant stakeholders have been identified and their main goals regarding the new repair and production process has been collected. A tree of all goals, decomposed to all subgoals, has been set up. After that, goal conflicts have been identified and aspects how to cope with them in the requirements analysis have been discussed. Subsequently two scenarios have been defined in which stakeholders target their goals and therefore have requirements on the new repair and production process. The results of conducted interviews with the identified stakeholders on requirements are not covered by this document. They will be included into the final version of the requirements on production platform (D2.6).

To understand the different development directions of all partners and incorporating the three AM processes, the indented solutions have been collected from the partners. An analysis led to a production platform which considers all solutions.

The specification of a one joint repair and production process was conducted by first defining a draft of a common process. This enables to get a joint understanding of the partners. After that each partner defined their specific process. All three processes have been condensed to an abstract version of a new repair and production process. This now acts as a sketch for defining requirements on the production platform. They will be included into the final version of the requirements on production platform (D2.6) as well.