Presentation of a Project Idea: LISA
Lightweight Integral Structures for Future Generation Aircrafts

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ACE Light-weight Materials Assessment, Computing and Engineering Centre

Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research

Motivation

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- Global Market Forecast for the Aircraft Industry[1]

GMF 2012 key numbers and 20-year change

World Fleet Forecast	2011	2031	% Change
RPK (trillions)	5.1	12.8	150%
Passenger aircraft fleet	15,560	32,550	109%
New passenger aircraft deliveries		27,350	
Dedicated freighters	1,620	2,940	82%
New freighter aircraft deliveries		850	
Total New Aircraft Deliveries		**28,200**	

Market value of $4 trillion



- R&D Strategic Areas

Environmental friendly air transportation

Increase of the Transportation capability

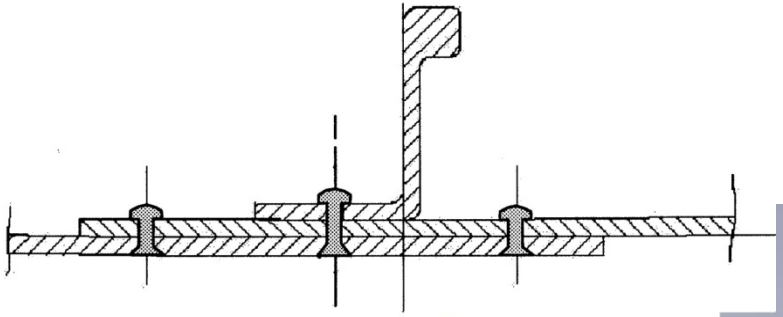
Increased safety and comfort for the passengers

Efficient aircraft

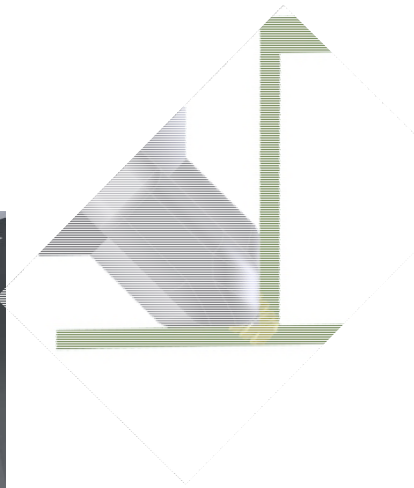
Efficient and low cost production, maintenance and repair of aircrafts

1 "Navigating the Future" by John Leahy, Airbus COO and Chris Emerson, Airbus Senior Vice President. Future Programmes & Market Strategy - 4 September 2012

Conventional Riveted Assembly Technology

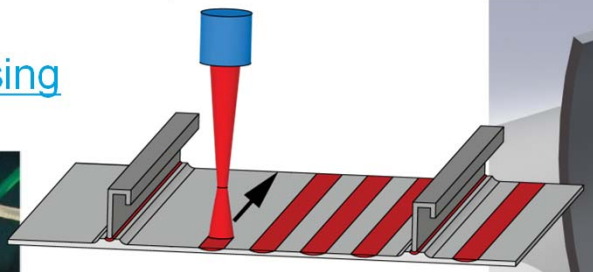


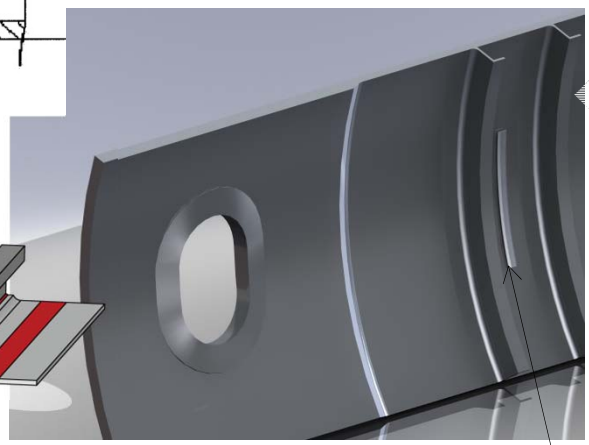
Future Assembly Technology

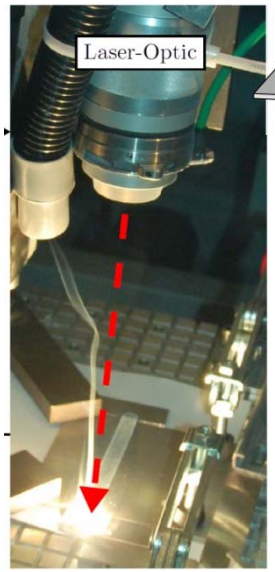




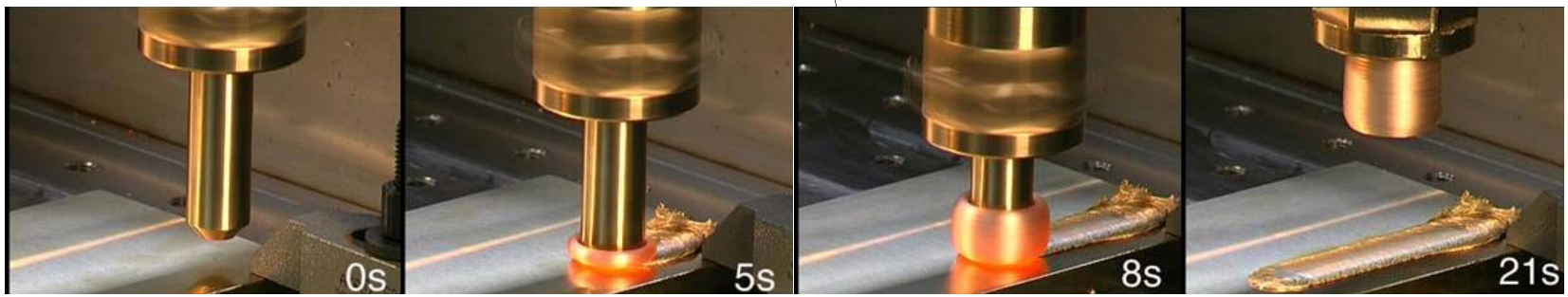
Laser Processing







Integral Crack Stopper



Challenges and Opportunities

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Callenges

- Up-Scaling to demonstration level
  - Materials supply
  - Up-scaling of processes
  - Demonstrator design
  - Demonstrator production

- Testing
  - Provision of reference panel
  - Structural testing
  - Damage introduction and assessment
  - Demonstrator validation

Opportunities for project participation

- Material supplyer (Industry)
- Machine manufacturer (Industry)
- Structural simulation (Research/Industry)

- Testing
  - Aircraft manufacturer (Industry)
  - Testing facility (Research/Industry)

Current state of Project Structure

Project Management

Work Package 1 (WMP)
Base Materials: Definition and Purchasing

Work Package 2 (WMF, WMP)
Base Materials Characterisation

Work Package 3 (WMP)
FSW Reference Panels

Work Package 4 (WMS, WMP)
Prediction of Crack Path under Monotonic Load

Work Package 5 (WMF)
Laser Heating Treatment

Work Package 6 (WMP)
Friction Surfacing



Production of Technology Demonstrators