Thomas Klassen, Hamburg University

Title: “Refurbishment and Lifetime Enhancement of Aircraft Components”

Authors: Thomas Klassen, Levke Wiehler, Markus Steierl, Sören Nielsen, Julio Gutierrez, Zahra Arabgol, Dhruvit Gabani, Marcel Lewke, Hongjian Wu, Alexander List, Hamid Assadi, Nikolai Kashayev, Benjamin Klusemann, Frank Gärtner

Abstract:
Aircraft components are typically replaced with new parts as soon as they show localized damage. Kinetic spraying has the potential to successively rebuild defective areas, thus saving considerable costs and resources in aviation. However, process parameters have complex interdependencies and must be individually adjusted. This includes primary parameters related to material and impact conditions, as reflected by the ratio between impact and critical velocity, but also secondary influences related to robotics, like transversal velocity of the gun over the substrate. Computer-based trajectory planning will be presented for different model repair geometries. Resulting critical mechanical properties like adhesion and cohesive strength are analyzed and discussed. Temperature gradients during deposition have a significant influence on stress distribution and potential crack propagation. Based on a comprehensive knowledge of mechanisms and processes, properties and stress states may be tailored to obtain as new properties in repair. These concepts can also be applied to new parts to control crack pathways and enhance service life.

Biography:

CV THOMAS KLASSEN

currently,	Full Professor/Shared Professorship:
since 2010	Director of the Institute of Hydrogen Technology, Helmholtz-Zentrum Hereon, Geesthacht, Germany
since 2005	Full Professor, Director of the Institute of Materials Technology, Helmut Schmidt University, University of the Federal Armed Forces Hamburg
1 to 6/2016 & 3 to 6/2014	Harris German/Dartmouth Distinguished Visiting Professor, Thayer School of Engineering at Dartmouth College, New Hampshire, U.S.A.
2011	Founding start-up company: Kinetic Spray Solutions GmbH, Buchholz
2005	Habilitation in Material Science, Technical University Hamburg, „Nanocrystalline Materials: Mechanisms, Properties, and Potential Applications“
1996 – 2005	Institute of Materials Research, GKSS Research Centre Geesthacht Director of the Department Powder and Nanotechnology
1994 – 1995	Post-Doc at the Institute of Materials Science and Engineering,

	University of Illinois at Urbana-Champaign, U.S.A.
1990 – 1993	Dr.-Ing. (Ph.D. in Engineering), Technical University Hamburg Institute of Materials Research, GKSS Research Centre Geesthacht
1990	Diploma in Physics, Technical University of Dortmund, Germany