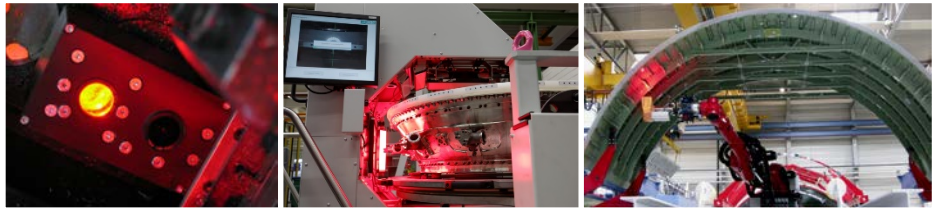
Fraunhofer IFF's aviation research activities

Dr.-Ing. Dirk Berndt, Fraunhofer IFF, 19. April 2017

13-th International
Scientific Conference "AVIA 2017"

National Aviation University, Kyiv



Agenda

- Fraunhofer-Gesellschaft
- aviation research activities
- European funded AERO-UA project
- some selected strategy recommendations

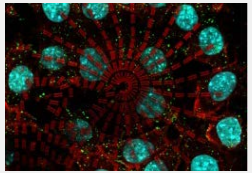
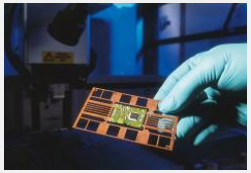
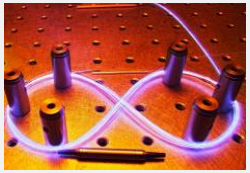
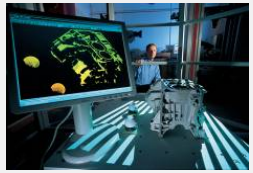
Dr.-Ing. Dirk Berndt , Kay Matzner

Agenda

- Fraunhofer-Gesellschaft
- aviation research activities
- European funded AERO-UA project
- some selected strategy recommendations

Dr.-Ing. Dirk Berndt , Kay Matzner

Fraunhofer-Gesellschaft – in profile

- 69 institutes and research units
- Over 24,500 employees
- Research budget of € 2.1 billion

Seven Fraunhofer Groups

- Information and Communication Technology
- Life Sciences
- Microelectronics
- Light & Surfaces
- Production
- Materials and Components
- Defense and Security

Dr.-Ing. Dirk Berndt , Kay Matzner

Fraunhofer-Gesellschaft – in Germany

- Fraunhofer IFF is a key research partner for
  - high flexible,
  - high efficient,
  - high quality and
  - human oriented (ergonomic)

  aircraft manufacturing of the future.
- main customers at the aircraft industry are:
  - Airbus, Premium Aerotec, Liebherr Aerospace, MTU Aero Engines, Rolls-Royes, etc.

© Fraunhofer IFF

Dr.-Ing. Dirk Berndt , Kay Matzner
19. April 2017

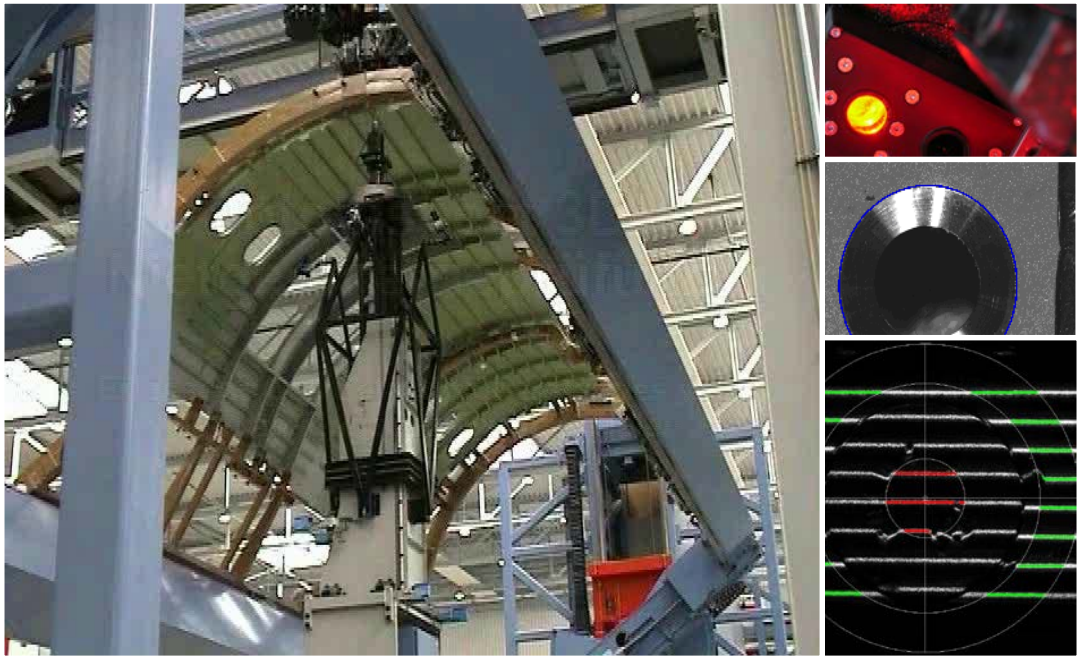
Fraunhofer IFF

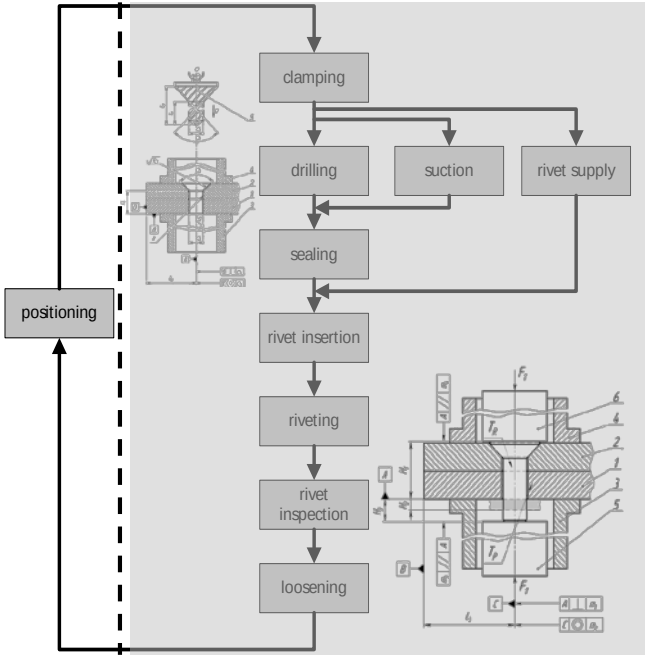
Agenda

- Fraunhofer-Gesellschaft
- aviation research activities
- European funded AERO-UA project
- some selected strategy recommendations

Dr.-Ing. Dirk Berndt , Kay Matzner

aviation research activities
optical inspection of joints



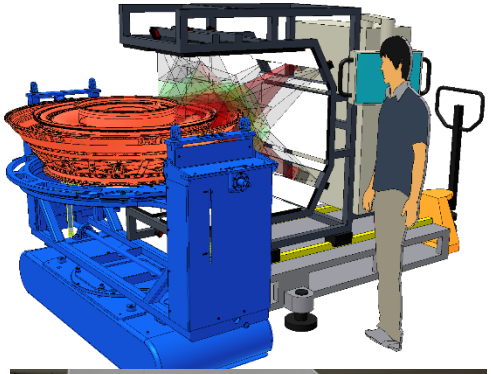


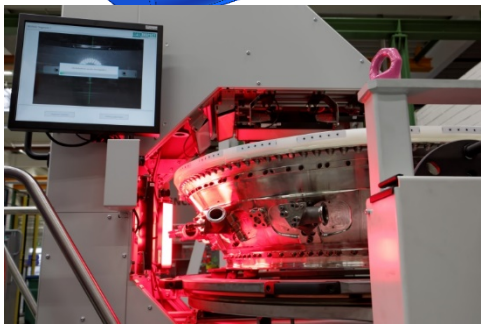
Dr.-Ing. Dirk Berndt , Kay Matzner

aviation research activities

portable optical assembly inspection at TCF module

- application example: aero-engine manufacturing
- task: inspection assistance in the aero-engine assembly line
- digital model information are the basis of:
  - automatic inspection planning
  - automatic calculation of synthetic data (target condition)
  - automatic inspection
  - documentation of inspection results



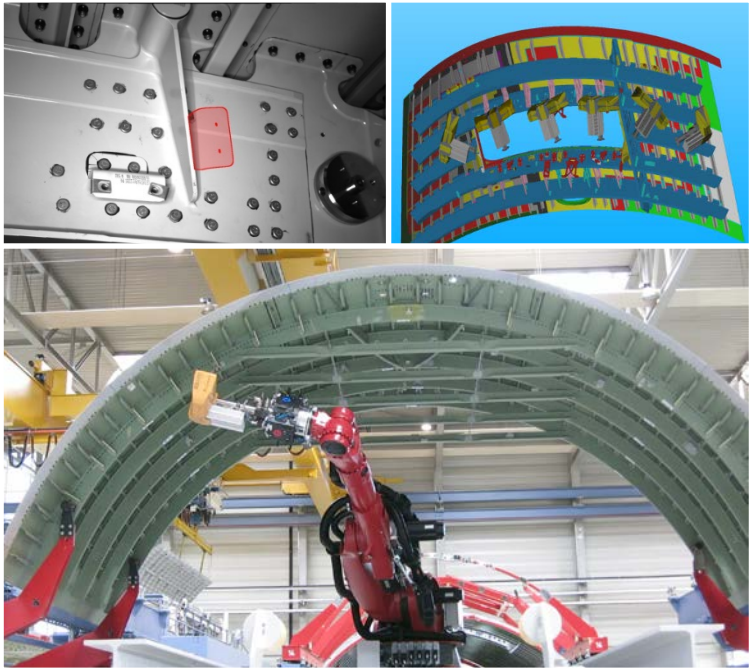


Dr.-Ing. Dirk Berndt , Kay Matzner

aviation research activities

robot based optical assembly inspection of fuselages shells

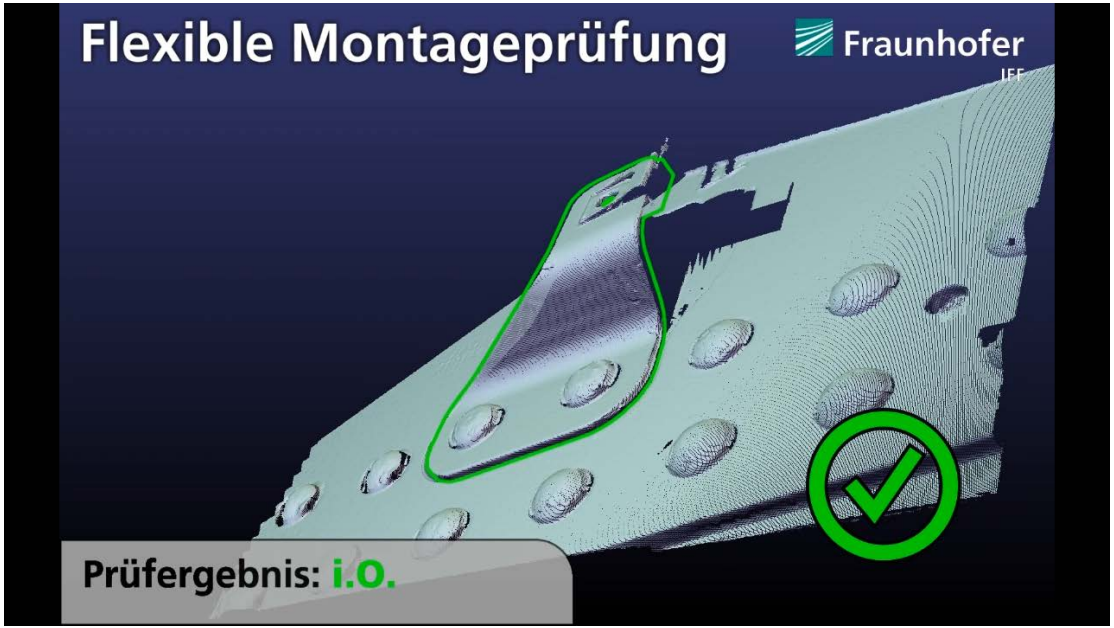
- assembly inspection of about 1,000 mounting parts and 10,000 fasteners
- digital model information are the basis of:
  - automatic inspection planning
  - automatic calculation of synthetic data (target condition)
  - automatic inspection
  - documentation of inspection results



Dr.-Ing. Dirk Berndt , Kay Matzner

aviation research activities
portable platform for human-machine-collaboration

- mobile
- autonomous
- collaborative
- physical assistance
- information assistance
- inspection assistance
- operation on demand
- self-learning



Dr.-Ing. Dirk Berndt , Kay Matzner

Agenda

- Fraunhofer-Gesellschaft
- aviation research activities
- European funded AERO-UA project
- some selected strategy recommendations

Dr.-Ing. Dirk Berndt , Kay Matzner

European funded AERO-UA project
aviation pilot projects

- two scenarios defined:
  - scenario 1: model-based assembly process
  - scenario 2: quality controlled riveting process
- partner:
  - Fraunhofer, UkrRIAT, FED, NASU-IPS and KhAI
- main goal:
  - exchange knowledge
  - conduct a feasibility study concerning the development of high efficient and high quality manufacturing processes for high-load air transport

Dr.-Ing. Dirk Berndt , Kay Matzner

European funded AERO-UA project

status of SWOT analysis created in pilot 3.3a activities

- **S:** availability of profound knowledge in aircraft manufacturing
- **W:** fairly outdated technology level of aircraft production lines
- **O:** availability of cooperation's between EU and Ukraine
- **T:** no existing admission in EU of certification issued in Ukraine

	Strengths	Weaknesses
Internal analysis	1. Availability of advanced aircraft industry in Ukraine 2. Availability of manufacturing processes and equipment, experience and personnel on the area of riveting 3. Availability of research, design, test and manufacturing competences to implement Scenario 2 4. There is an aim to modernize aircraft industry at innovative basis 5. Fairly cheap labor force 6. Availability of advanced optical industry in Ukraine 7. Availability of relations and experience of collaboration in the area of automatic riveting with leading European companies	1. Lack of balance in hand for the companies and research institutes 2. Insufficient support from government 3. Fairly outdated technology level of aircraft production lines 4. Lack of experience of optical inspection of the riveted joint parameters 5. Extortionate system of production crediting 6. High risks in connection with problems of partial occupation of Ukrainian territory 7. Long terms of innovation introduction 8. Poor domestic market for aircraft production 9. Marginal age of principal carriers of competences
	Opportunities	**Threats**
External analysis	1. Availability of Association Agreement and Science and Technology Cooperation Agreement between EU and Ukraine 2. Ukrainian companies are eligible to participate in EU frame program joint research 3. Availability of worked through technology of the riveted joint optical inspection and its transfer to Ukraine possibility 4. Availability of worked through technology and equipment of automatic riveting and its transfer to Ukraine 5. In light of breakdown of cooperative relations with Russian companies there is an opportunity to re-orient science and technology cooperation to EU 6. Availability of crediting mechanism for joint projects at acceptable conditions 7. Enter into market jointly with European companies	1. There are no investment funds for innovation project development in Ukrainian aircraft industry 2. There is no section in Association Agreement concerning aircraft industry 3. European companies do not strive to investing into unstable Ukrainian economy 4. High competition at the aircraft market in Europe and other countries 5. There is no admission in EU of certificates (production approval, aircraft type) issued in Ukraine

Dr.-Ing. Dirk Berndt , Kay Matzner

Agenda

- Fraunhofer-Gesellschaft
- aviation research activities
- European funded AERO-UA project
- some selected strategy recommendations

Dr.-Ing. Dirk Berndt , Kay Matzner

some select strategy recommendations

- to create in Ukraine aircraft industry knowledge transfer center
- to arrange information about financing possibilities
- to analyze Ukrainian aircraft industry for obtaining proposals for EU investors
- to analyze what is necessary to do in order to Ukrainian certificates be admitted in EU
- to organize advertisement campaign in countries – potential consumers of Ukrainian aircraft products, to identify customers, investors

Fraunhofer IFF

Let us do research together!

Dr.-Ing. Dirk Berndt

Head of Business Unit Measurement and Testing Technology
Phone +49 391 4090-224
Dirk.berndt@iff.fraunhofer.de

Kay Matzner

Head of International Projects

Phone +49 391 4090-159
Kay.matzner@iff.fraunhofer.de

»Industry is facing a fundamental paradigm shift. The continuous digitalization of all processes will inevitably lead to entirely new business models«