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The Aeronautics Research Programme of the German Federal Ministry of Economics and Technology (BMWi)

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Outline

1. Importance of Aeronautical Research
2. LuFo in the European Context
3. General Background of LuFo
4. Project Examples
5. Focus & Orientation of the New Call

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3 Pillars - Research in Aeronautics

EU - Level

competitiveness on EU - level

projects with great socio economic impact on transnational level

projects with workshares in different (European) countries

technology demonstrators

National - Level

projects with focus on national core competencies

projects with impact mainly on German national level

projects of networks consisting of industry, SMEs, universities and research organisations

Regional - Level

projects with focus on regional supply chain

promotion of framework conditions on a regional level:

- funding of local research networks
- education
- funding of universities, research centers and infrastructure

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LuFo in the European Context

FP7 fosters creation of **transnational networks** which:

- are not bound by the core competencies of certain national industries
- cover the whole European industrial value chain
- have the critical mass to integrate specific technologies into marketable innovations

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LuFo – Major Objectives of the Programme

- strong perspective towards industrial applications and products
- creation and use of a powerful research network
- technological leadership and competitiveness
- provision of a level playing field
- environmental and societal challenges like emissions, safety and acceptance of air transport

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LuFo – Basic Funding Conditions

- industrial companies = in general **40%**
- SMEs = in general **50%**
- universities and research organisations = **100%**
- bonus up to 10% for industrial companies or SMEs if universities, research institutes or SMEs participate as subcontractors

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LuFo – Definition of the Research Agenda

The research agenda of LuFo is defined

- according to the ACARE SRAs
- by the LuFo Advisory Board (Luftfahrtforschungsbeirat) (national)
- by the „Bund-Länderausschuss“, a board consisting of representatives of the federal ministry and the Länder (national -regional)
- LuFo and regional programmes use the same project management („PT-L“) in order to synchronize federal and regional programmes

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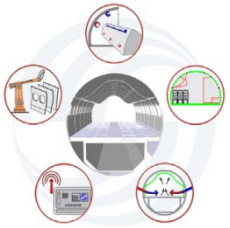
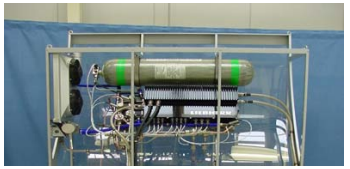
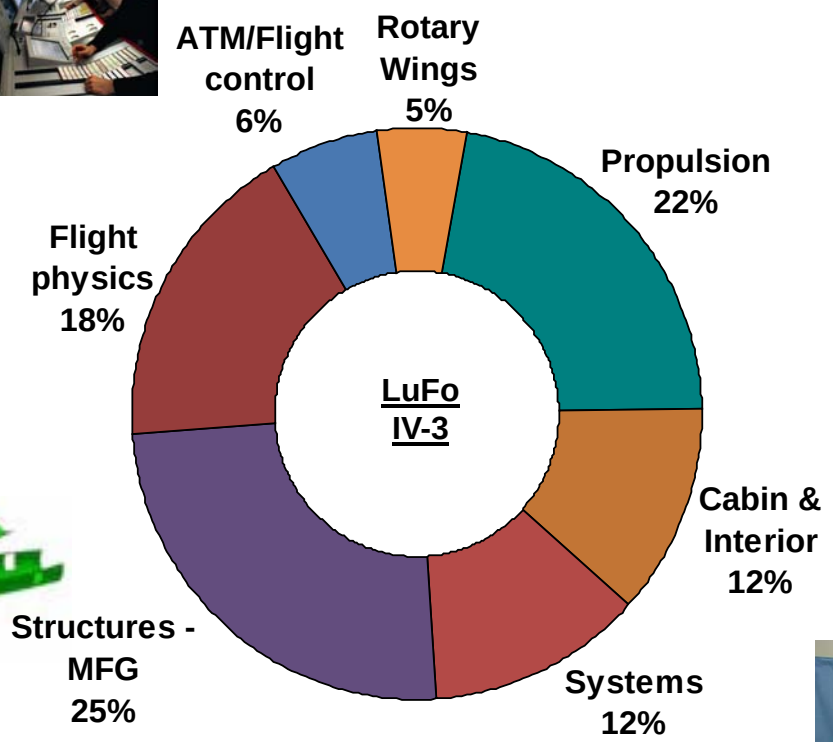
LuFo – Budget Allocation







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InRoS – Innovative Rotor Steering

Goal

innovative rotor-system for next generation helicopters

Partner

Eurocopter, ZF Luftfahrttechnik, EADS IW, DLR

Tasks

review/analysis of current rotor head-concepts
optimization of the aerodynamic attributes by

- using individual blade control instead of conventional swash plate
- implementation of a hybrid control system

Achievement

- Blue Pulse – actuated flap modules located at the trailing edge eliminate „slap noise”, thus reducing noise by 5dB
- reduction of vibration levels on landing by 80%

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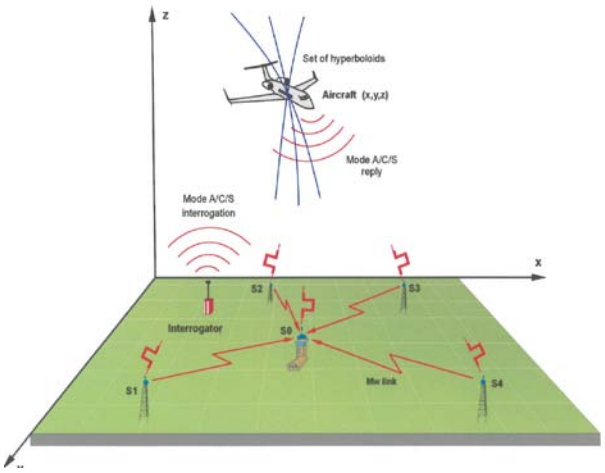
WAM – Wide Area Multilateration



Goal

Development and validation of an ATM enroute surveillance system. Replacement of costly radar deployment.

Partner

THALES ATM, Korntal und iAD, Erlangen

Tasks

- Dev. of supporting sensor for direction finding
- Screening for adequate station sites in testing area
- performance modelling/error model
- very high precision GPS time synchronisation
- 3D-hyperbolic surveillance algorithms

Achievement

Aeroplane Locating System using transponder transmissions

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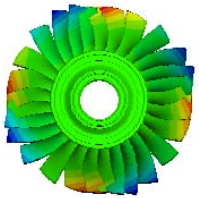
Blisk – Bladed Disc Research in LuFo



design

manufacture

repair

product

Goal

- improve performance by reducing weight and leakage flow
- reduce production cost
- enable suitable repair

Partner

MTU Aero Engines, Rolls Royce Germany, Leistritz, BCT

Achievements

- design method against flutter elaborated
- optimised manufacturing processes established
- dedicated repair technologies developed

Exploitation

products BR725, GTF, TP400…

increase in manufacturing capability in Munich & Oberursel

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TANs – TiAL-Turbine Blade Casting Process

Goal

production of TiAl low pressure turbine blades of 250 to 400 mm length by centrifugal casting in a near-net-shape process reducing blade weight by 50% (TiAl as an intermetallic compound has half the density of a Nickel alloy) and production cost

Partner

ACCESS (association), Tital (SME)

Tasks

- robust production process development
- analysis of process steps
- elaboration of an industrial production concept
- prototype blade production and optimisation

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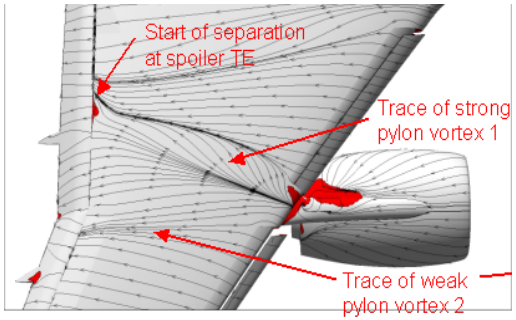
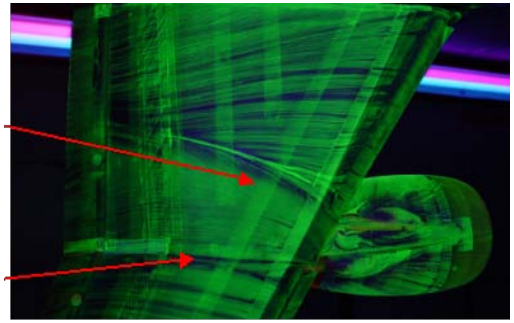
HINVA – High-Lift In-Flight Validation





Goal

- Verification and improvement of the aerodynamic development tools for High-Lift-Systems Design
- increasing precision and reliability of aerodynamic performance prognosis

Partner

DLR, Airbus, ETW

Objective

Limit deviation of the relevant aerodynamic coefficients C_L and C_D up to 2% comparing

- CFD-Prognosis
- Wind Tunnel tests
- Flight Test