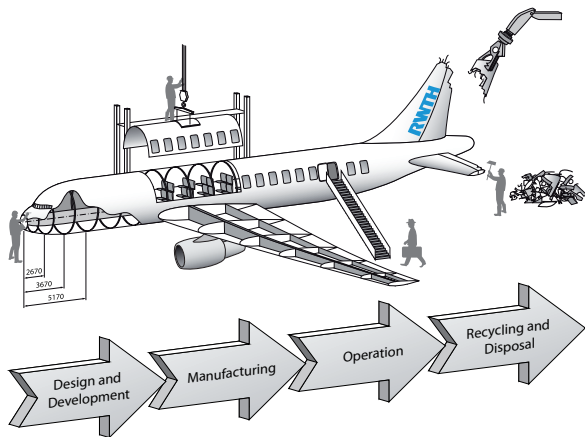


# Air Transport Vehicle Life Cycle Analysis

## Interdisciplinary Life Cycle Analysis

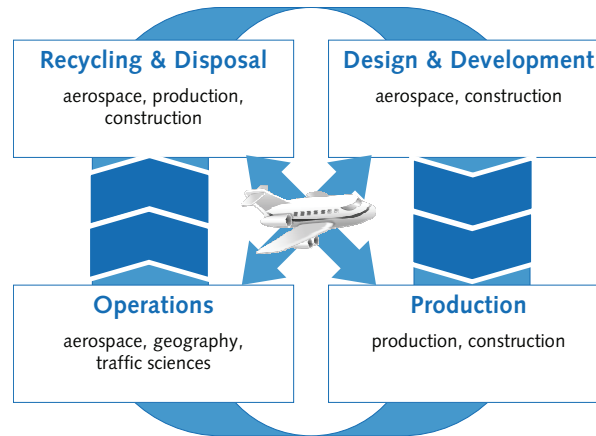
Funded by the Excellence Initiative of the German Federal and State Government



## Motivation and Goals

A sound evaluation of new technologies in aviation requires an examination of the economic and ecological impacts on the whole aircraft life cycle from design to disposal.

Examining the life cycle as a whole means involving competences from different technical and economic fields. These are united by an interdisciplinary approach in the ATLA project.



**Economic, ecological and social analysis**

### Primary Objective:

Development of an economic, ecological and social evaluation methodology for civil air transport.

### Secondary Objective:

Exploring the effect of design parameters on the commercial aircraft life cycle.

## Interdisciplinarity

Evaluation of the four phases of the life cycle based on the three pillars of sustainability: economic, environmental and social.

Assigning projects to partner institutes on the basis of their expertise:

- ILR: aircraft design and research in aeronautical technology
- ikt: product design and product life cycle management (PLM)
- VIA: airport and air transportation
- WZL: manufacturing and energy and resource accounting
- Department of Geography:
  - GEO (Physical Geography and Climatology Group): climatology
  - WiGeo (Chair of Economic Geography): externalities of air transport

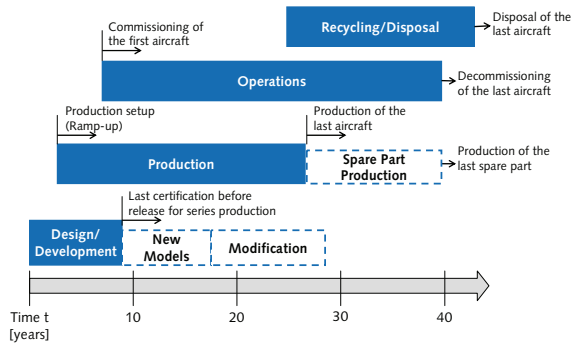
	Design / Development	Production	Operations	Recycling / Disposal
economic	A1 (ILR, ikt)	A2 (WZL)	A3 (VIA, WZL, ILR)	A4 (ikt, WZL)
ecological	A8 (ILR, ikt)	A5 (WZL, ikt)	A6 (GEO, VIA, ILR)	A7 (ILR, WZL, ikt)
social	A9 (WiGeo, ILR, ikt)	A10 (WiGeo, WZL, ikt)	A11 (WiGEO, VIA, WZL, ILR, GEO)	A12 (WiGeo, ILR, WZL, ikt)

A0

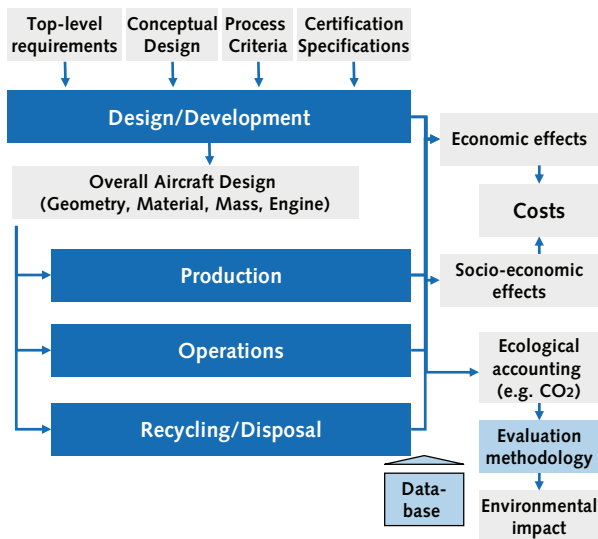
# The Aircraft Life Cycle

The aircraft life cycle, which covers a period of up to 40 years, can be subdivided into four main phases:

- design/development
- production
- operations
- recycling/disposal



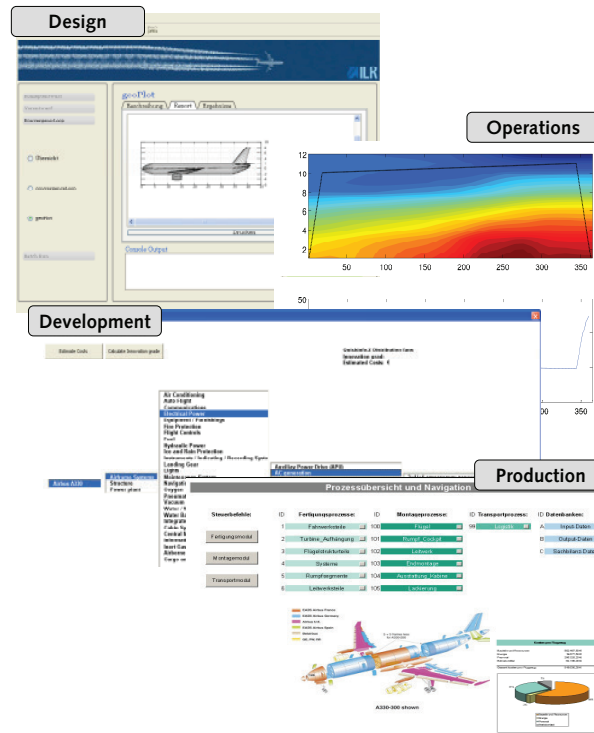
The following schematic diagram shows the economic, ecological and social evaluation processes of the whole life cycle.



# Evaluation Methodology

Development of an interdisciplinary evaluation methodology with the following attributes:

- modular concept
- interconnecting program modules via an integration platform
- automated implementation of parameter studies and optimisations



## Application:

- support for technology decisions
- improvement of cost accounting
- making recommendations for action for aircraft manufacturers, airlines and governments
- anticipation of expected climate-protection fees

# Partner Institutes



**Univ.-Prof. Rolf Henke**  
Institute of Aeronautics and Astronautics



**Univ.-Prof. Dr.-Ing. Jörg Feldhusen**  
Institute for Engineering Design



**Univ.-Prof. Dr. rer. nat. Johannes Reichmuth**  
Institute of Transport Science – Department of Airport and Air Transportation Research



**Univ.-Prof. Dr.-Ing. Robert Schmitt**  
Laboratory for Machine Tools and Production Engineering



**Univ.-Prof. Dr. rer. nat. Christoph Schneider**  
Department of Geography – Physical Geography and Climatology Group

**Univ.-Prof. Dr. phil. Martina Fromhold-Eisebith**  
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