

Strengthening Research Infrastructures in Aeronautics and Air Transport (Aviation)

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Knowledge for Tomorrow

Content

- Association of European Research Establishments in Aeronautics (EREA)
- Advisory Council for Aviation Research and Innovation in Europe (ACARE)
- International Cooperation in Aviation
- Some thoughts on lessons learned
- Outlook





EREA history

- 1993: Joint Position paper
- October 1994: AEREA creation
- May 1999: Establishment of EREA Association



AEREA signing ceremony in Brussels 1994.



EREA Objectives

EREA is a **non-profit association** with the objectives :

- to promote and represent the **joint interests** of its members;
- to intensify the **co-operation** between its members, aimed at **further integration** of their activities in the field of **civil, military and space-related aeronautics**;
- to improve and intensify the co-operation of EREA and its members with third parties in the field of aeronautics;
- to facilitate the ultimate goal of the Members of an integrated management of joint activities, thereby contributing to Europe's role as a **global player in aeronautics**.



Association of European Research Establishments in Aeronautics



ONERA



Associate Members

- AIT** Austrian Institute of Technology Austria
- VKI** Von Karman Institute Belgium



EREA membership (2)

Full Members

CIRA	C entro I taliano R icerche A erospaziali	Italy
DLR	D eutsches Zentrum für L uft- und R aumfahrt	Germany
FOI	Totalförsvarets F orsknings I nstitut	Sweden
ILOT	I nstytut L OTnictwa	Poland
INCAS	I nstitutul N ational de C ercetari A ero S patiale "Elie Carafoli"	Romania
INTA	I nstituto N acional de T écnica A eroespacial	Spain
NLR	N ationaal L ucht- en R uimtevaartlaboratorium	Netherlands
ONERA	O ffice N ational d' É tudes et de R echerches A érospatiales	France
VZLU	V ýzkumný a Z kušební L etecký Ú stav, a.s.	Czech Republic

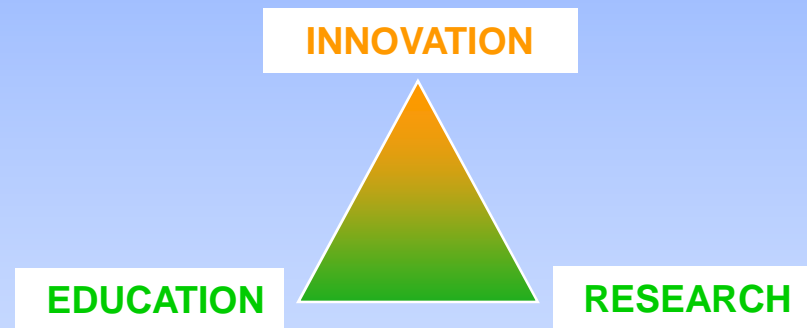
Associate Members

AIT	A ustrian I nstitut for T echnology	Austria
VKI	V on K arman I nstitute	Belgium

Affiliate Members

AFIT	A ir F orce I nstitute of T echnology	Poland
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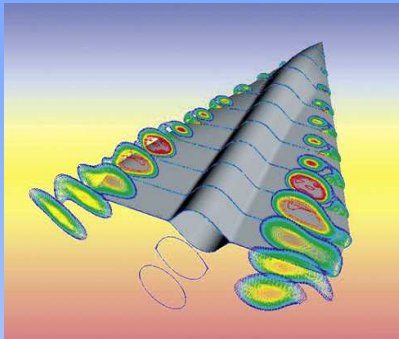
- EREA is a major contributor to European aeronautical research addressing all elements of the “triangle of knowledge” in this field:



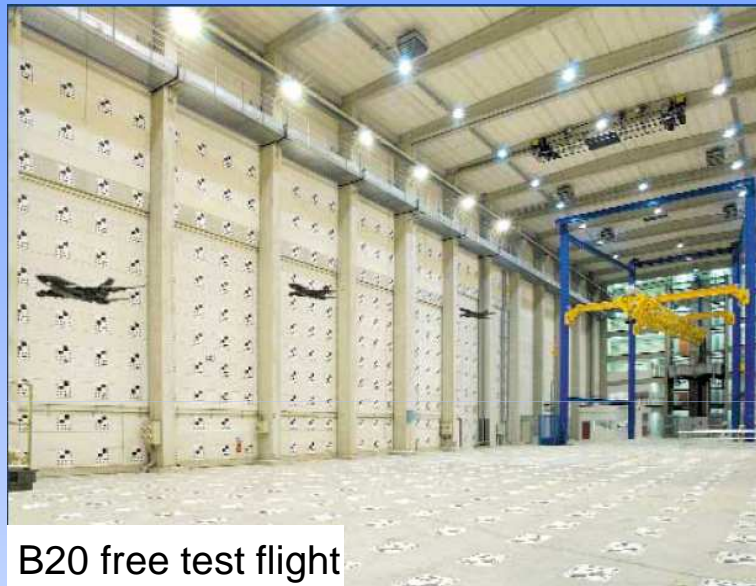
- EREA has proven on bi- and multilateral basis the concept of the European Research Area



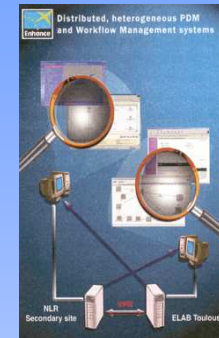
Multi-disciplinary research



Aerodynamics



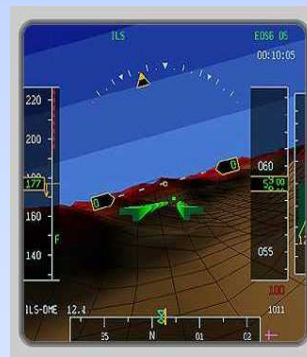
B20 free test flight



Concurrent Engineering



Propulsion



Avionics



Acoustics



Flight Mechanics



Multi-disciplinary research



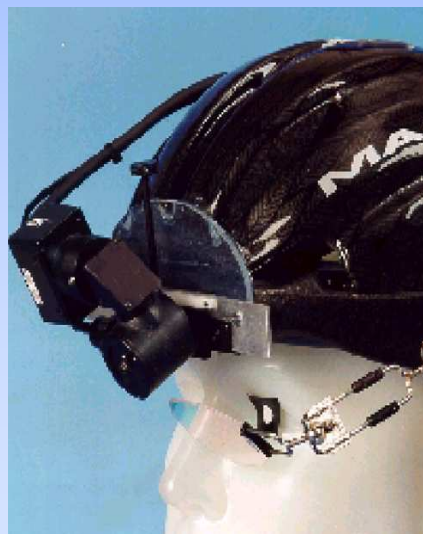
Simulation



Flight test



Environment



Human Factors



Aircraft Operations



Air/Airport Traffic Management



Safety



Some facilities



IWT



Falcon



Tower Simulation



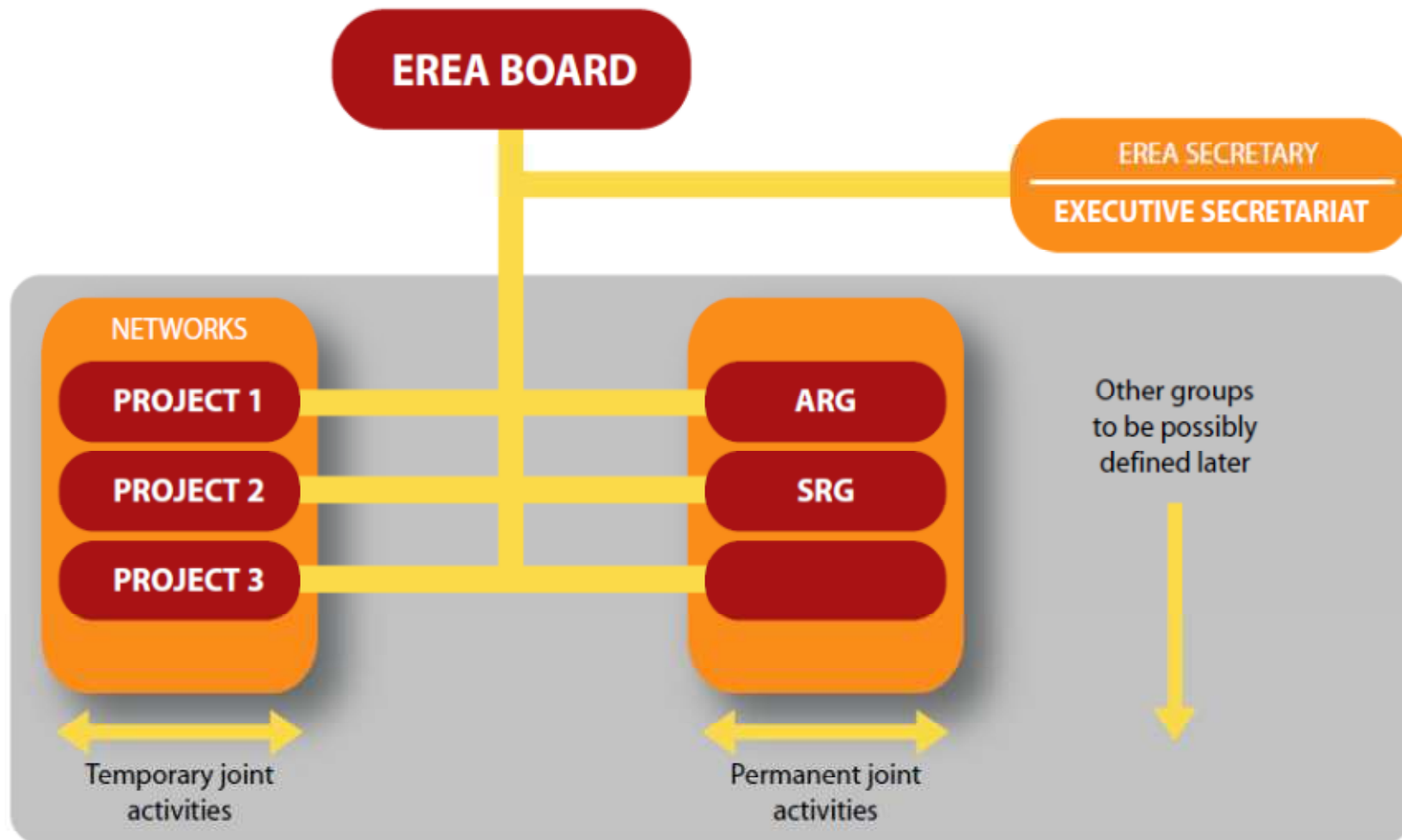
DNW



LISA



Crash Tower





EREA basic data (year 2010)

Total employees in the aeronautics fields :	4720
Scientists in the aeronautics fields :	2820
Intramural aeronautics research for R&T :	447 M€
Annual Investments :	181 M€
Annual revenues from EU projects :	55 M€
PhD thesis / year :	146
Total number of publications :	8017
Publications in refereed journals :	1090



Joint programmes (1)

■ **ONERA DLR bi-lateral cooperation**

Cooperation initiated more than 30 years ago. a number of agreements have been concluded and bilateral programs have been initiated and implemented:

- **1992 'Co-ordinated Aeronautical Research'** General framework agreement
- **1997** agreement on 'Personnel Exchange'
- **1998** 'DLR-ONERA partnership in Rotorcraft Research' establishing Joint Programme with common management team
- **2001** 'Research and Technology General Partnership Agreement ' (Eurocopter, DLR, ONERA)



Joint programmes (2)

■ ONERA DLR bi-lateral cooperation (cont'ed)

- **2001** 'DLR-ONERA partnership in Transport Aircraft Research'
- **2005** 'DLR-ONERA- Airbus Research and Technology Framework agreement'
- **2006** 'DLR-ONERA partnership in Measurement and Observation Techniques for Aerospace Research'
- **2006** 'European Aeroelasticity Key Laboratory EURAKEL'



Joint programmes (3)

■ NLR DLR bi-lateral cooperation

Cooperation initiated in 1973 through regular joint Board meetings.

- **1974** implementation of the German Dutch Windtunnel with the building of a DNW wind tunnel
- **1998** a stepwise integration of the operation of all DLR and NLR wind tunnels under the responsibility of the DNW has been initiated
- **1994** NLR DLR Cooperation agreement establishing a.o. a NLR DLR program committee and initiating common research projects
- **2000** initiation of harmonisation of ATM activities between both establishments
- **2005** establishment of the DLR NLR strategic alliance in ATM research, AT – One



Joint programmes (4)

- **Trilateral cooperation within EREA and with industry**
 - **2000** 'Wind Tunnel Co-operation Agreement ' (ONERA, DLR, NLR)
 - **2000** 'Memorandum of Understanding on Common research to be performed on liquid rocket propulsion' (CNES, DLR and ONERA)
 - **2001** 'Co-operation agreement on the design and manufacturing of cryogenic models' (ONERA, DLR, NLR)
 - **2005** 'DLR-ONERA- Airbus Research and Technology Framework agreement'
 - **2006** 'Aero Testing Alliance EEIG (ATA)' (ONERA, DNW)
 - **2011** European Windtunnel Association (EWA) EEIG created



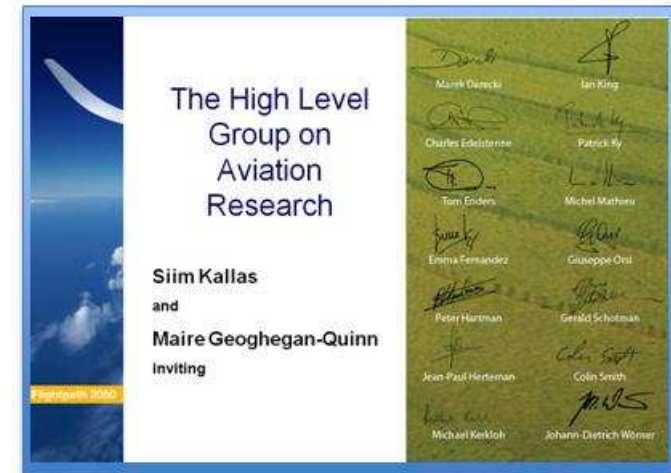
Internal activities (4)

- Best paper award (5000€)
- Young EREA (dedicated event in December)
- Mobility support
- Towards the future generation of ATS:
 - ATS vision study (ONERA-**DLR**-CIRA), **64 k€**
 - ATS step 2 (**ONERA**-CIRA-DLR-NLR-ILOT-INCAS-INTA), **636 k€**

ACARE Mission



- **Recognise Establish a network for strategic research in aviation for all European stakeholders**
- **Launch and approve the Strategic Research and Innovation Agenda (SRIA), update it periodically and monitor implementation towards the 2050 vision**
- **Make strategic and operational recommendations and priorities for implementing the SRIA and achieving the 2050 Vision**
- **Develop and implement a communication strategy to promote awareness of the SRIA**
- **ACARE comprises public and private stakeholders who help ensure shared objectives and commitment both to prepare as well as implement the elements of the SRIA**
- **Facilitate stakeholder co-operation in Europe and internationally as well as aviation representation at events and forums**

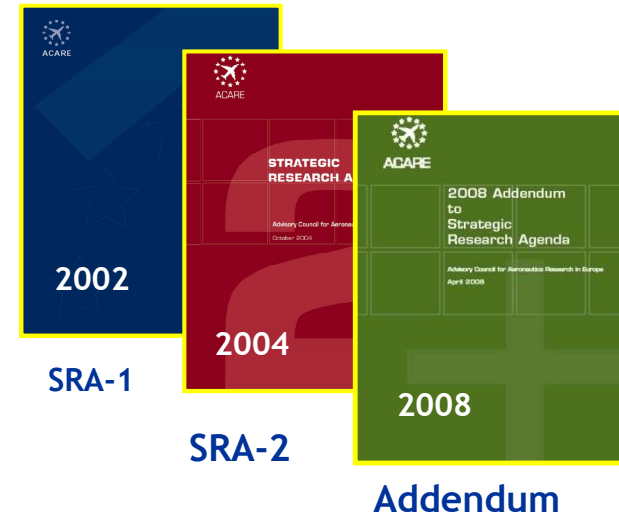


ACARE achievements so far

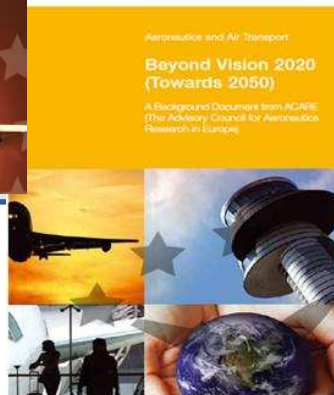


A comprehensive response to Vision 2020 **Strategic Research Agenda**

- *Responding to society's needs*
- *Securing global leadership for Europe*



A decade of
**Successful
Innovation**



New thinking
to go beyond
2020



Flightpath 2050



www.acare4europe.co.org

General Assembly

- 27 Member States
 - European Commission
 - Manufacturing Industry
 - Airlines
 - Airports
 - Air Navigation
 - EASA
 - Eurocontrol
 - Research Centres
 - Universities
 - Energy
 - Regulators
- Over 50 members

Steering Group

Monitoring Group

Member States Group

Communication Group

Permanent
Groups

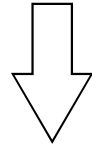
- WG1) Meeting Societal and Market Needs
- WG2) Maintaining and Extending Industrial Leadership
- WG3) Protecting the Environment and the Energy Supply
- WG4) Ensuring Safety and Security
- WG5) Prioritising Research, Testing Capabilities & Education

Ad-Hoc Groups

Vision 2050

Responding to society's needs

Securing global leadership for Europe



Five Objectives of the Strategic Research & Innovation Agenda

Meeting Societal and Market Needs

Maintaining and Extending Industrial Leadership

Protecting the Environment and the Energy Supply

Ensuring Safety and Security

Prioritising Research, Testing Capabilities & Education

Meeting Societal & Market Needs

European citizens are able to make informed mobility choices

90% of travellers within Europe are able to complete their journey, door-to-door within 4 hrs.

Flights arrive within 1 minute of the planned arrival time

An air traffic management system is capable of handling 25 million flights a year in Europe

A coherent ground infrastructure is developed

Maintaining & Extending Industrial Leadership

The whole European Aviation industry is strongly competitive

Europe maintains leading edge design, manufacturing and system integration capabilities and jobs

Streamlined systems engineering, design, manufacturing, certification and upgrade processes have addressed complexity and decreased development costs.



Protecting the Environment and the Energy Supply

In 2050 technologies and procedures available allow

- ❑ 75% reduction in CO₂ emissions per passenger kilometre,
- ❑ 90% reduction in NO_x emissions, and
- ❑ 65% reduction in perceived noise emission of flying aircraft

relative to the capabilities in 2000.

Aircraft movements are emission-free when taxiing.

Air vehicles are designed and manufactured to be recyclable.

Europe is established as a centre of excellence on sustainable alternative fuels

Europe is at the forefront of atmospheric research



Ensuring Safety and Security

The European air transport system has less than one accident per ten million commercial aircraft flights. (- 80% for specific operations, reference: 2000)

Weather and other hazards are precisely evaluated and mitigated.

Seamless operations through fully interoperable and networked systems (incl. manned and unmanned vehicles)

Efficient boarding and security checks allow seamless security

Air vehicles are resilient by design to security threats

The air transport system has a fully secured global high bandwidth data network, hardened and resilient by design.

Prioritising Research, Testing Capabilities and Education

European research and innovation strategies are jointly defined by all stakeholders

A network of multi-disciplinary technology clusters are created

Strategic European aerospace test, simulation and development facilities are identified, maintained and continuously developed

Students are attracted to careers in aviation. Courses offered by European Universities closely match the needs of the Aviation Industry



Strategic Research and Innovation Agenda (SRIA)



**Road map for aviation research, development & innovation -
New European Aviation Research Strategy (NEARS) project**

Content aligned to five goals of Flightpath 2050:

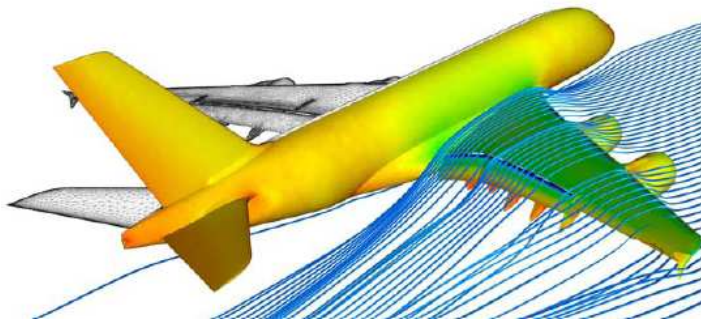
Meeting Societal and Market Needs

Maintaining and Extending Industrial Leadership

Protecting the Environment and the Energy Supply

Ensuring Safety and Security

Prioritising Research, Testing Capabilities & Education



**Publish in 2012 to inform the
European Research Framework on
Aviation Research in Europe**

SRIA Success Factors



- **Recognise Aeronautics and Air Transport System as a distinct European and National priority and enabler for growth**
- **Identify and preserve Europe's research infrastructure requirements**
- **Maintain R&T support mechanisms at both European & National level**
- **Encourage sustained flow of competent, trained and motivated people**
- **Supply chain – ensure coordination at all levels from integrator to SME in innovation and exploitation**
- **Ensure certification and qualification procedures for a safe Air Transport System meeting society's needs**

Summary past development

- Aeronautics and Air Transport (Research) can only be successful if done in international/European Cooperation
- Development of European industries followed by
- European approach by national research establishments (EREA) and later
- by Universities (European Aerospace Science Network, EASN)
- Set-up of ACARE to define jointly European Strategies, which
- Implemented in a harmonised way under individual responsibility



International Collaboration in Aviation

Two different scenes:

- Aeronautics:
 - Duopoly (US/EU) in system manufacturing industry for big a/c
 - European Equipment industry (still mainly nationally organised) serving all a/c producers world wide
 - National Research Establishments in support to national and European needs
 - International cooperation only on few selected topics possible
- Air Transport:
 - Safety, Security, Air Traffic Management are global challenges
 - Cooperation EU-US: SESAR – NextGen
 - Preferred topics for international cooperation



Some thoughts on lessons learned

- European Collaboration and integration must be based on common goals (win-win)
- Earning money is a goal for cooperation (e.g. EC projects), but not enough for integration
- Integration needs stronger common goals (e.g. common content and/or industrial partner and/or efficiency goal) and a strong will !
- Constraints mainly based on RE internal, national and/or industrial boundary conditions
- No real legal constraints
- but legal constraints are often used as excuse not to tackle the real concerns
- If there is a strong will on all sides (top level!), integration approaches will be managed successfully



Outlook

- Based on Flightpath 2050 a new Strategic Research and Innovation Agenda (SRIA) for Aviation is in preparation including
 - Definition and selection of strategic facilities
 - Way forward to define, select and implement European clusters
- Review and adapt EREA strategy according to Flightpath 2050 and SRIA
 - Possible next steps for research infrastructures ?
 - Common management of projects/programmes (joint programming)?
 - Idea to prepare a Joint Research Initiative (JRI)

