



Public-Private Partnership Strategies: New Paradigms for Sustainable Space Education and Outreach Development

-Way of Implementation and Development in Europe-

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Content

- „Dream of Human-Space-Flight“
-overall fascination of Aeronautics and Astronautics-
- „Job (as/or a) mission?!“ – change of values and standards within the last decades
- Theoretical demand/requirement versus real offer – a long educational way to find the right profession
- Public Private Partnership Strategies – successful tool for space education and outreach development
- Education „interactiv“ – European examples
- Future plans – Europes focus on R&D in Aeronautics and Astronautics
- Summary

„Dream of Human-Space-Flight“

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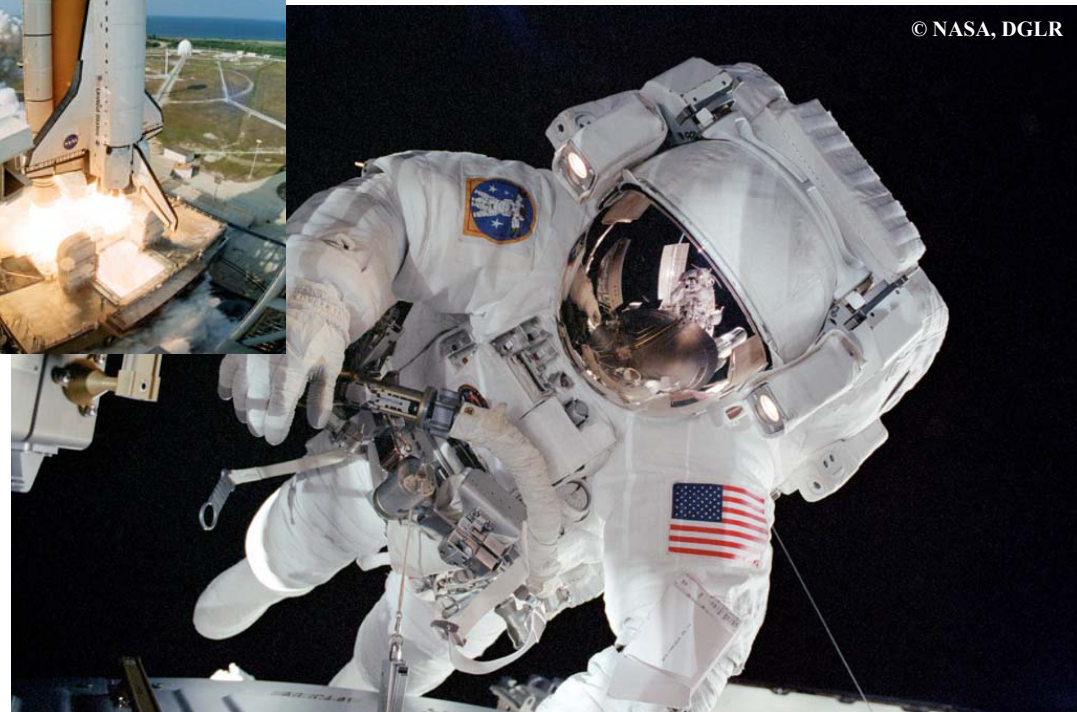
-overall fascination Aeronautics and Astronautics-



Thomas Reiter, ESA Astronaut



I will become an astronaut ...



„Dream of Human-Space-Flight“

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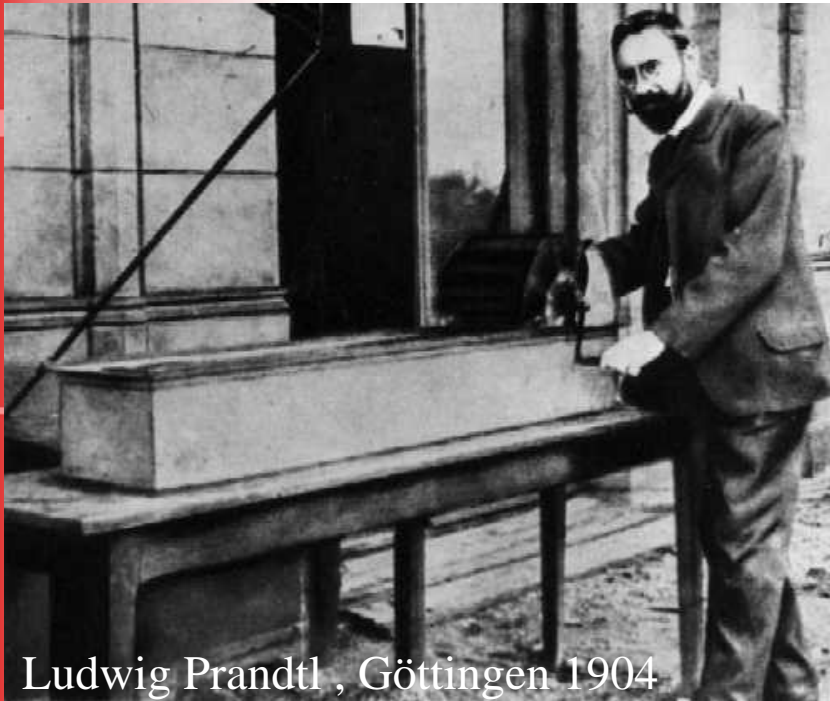
-overall fascination Aeronautics and Astronautics-



... or even pilot!



„Job as mission?!“ – change of values and standards within the last decades



Ludwig Prandtl , Göttingen 1904



Lecture, University Bremen 2005

$$\nabla^2 \Phi - \frac{1}{a^2} \left[\frac{\partial}{\partial t} + (\nabla \Phi) \circ \nabla \right] \left[\frac{\partial \Phi}{\partial t} + \frac{1}{2} (\nabla \Phi)^2 \right] = -\frac{1}{a^2} \frac{\partial}{\partial t} f(t)$$

Potential-equation



„Job a mission?!“ – change of values and standards within the last decades

Main focus within training, schooling and education in Astronautics:

- Mathematics–natural sciences ~ 30 %
- Technical/engineering basics ~ 30 %
- Interdisziplinäre qualification ~ 20 %
- Applied engineering and its methodology basics ~ 20 %



„Job a mission?!“ – change of values and standards within the last decades

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„Job a mission?!“ – change of values and standards within the last decades

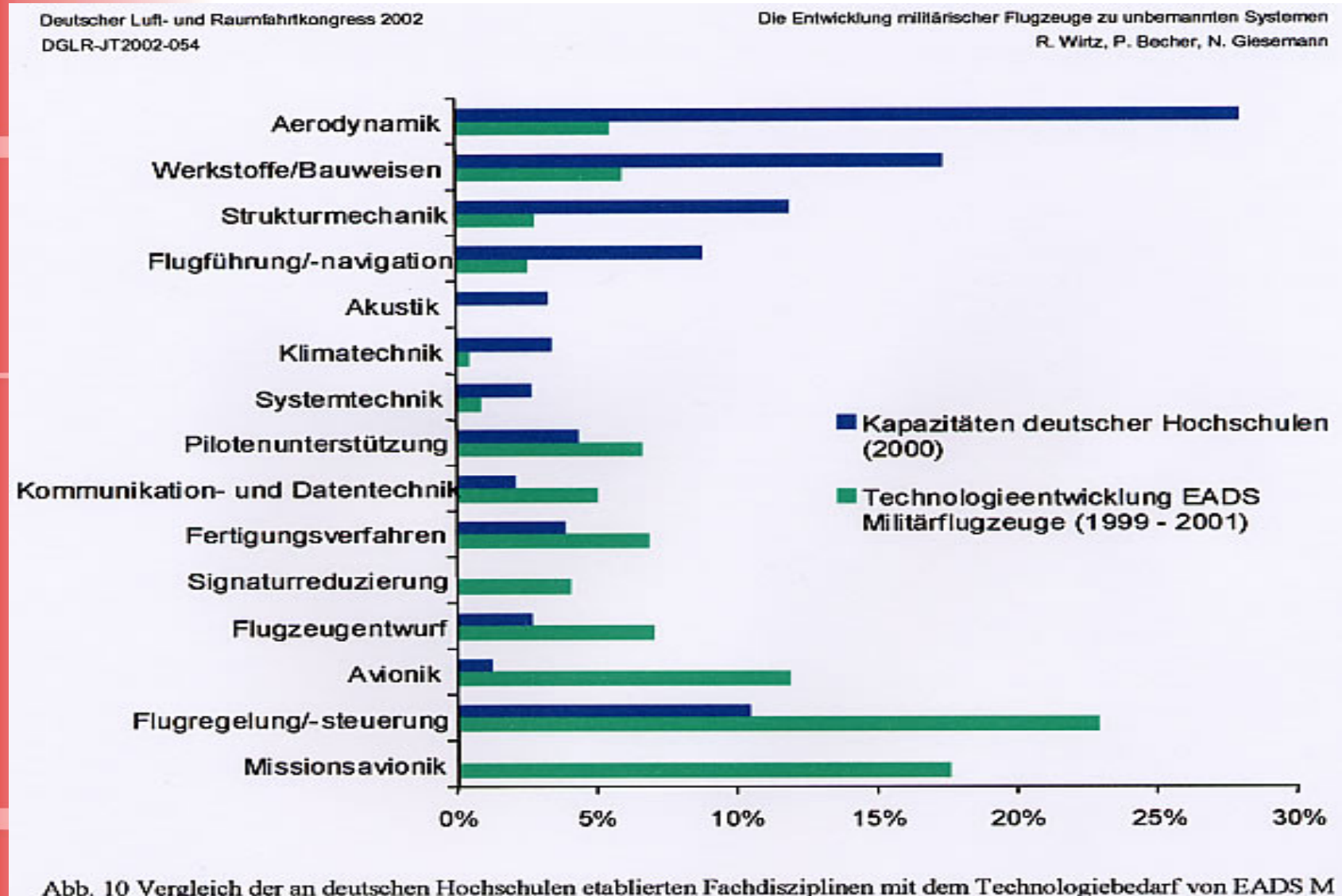
Additional/special requirements and personal needs for the successful future engineer:

- **Innovative**
- **Flexible**
- **Customerorientated**
- **Economically successful**
- **Socially competent**
- **Highly communicativ**
- **Creative and self trained**

(by Prof. Dr. Milberg, CEO, BMW AG, Munich, Germany)



Theoretical demand versus real offer





WEB OF SKILLS - THE AEROSPACE WORKFORCE (SPECIALIZATION AND MULTIDISCIPLINARY INTEGRATION)

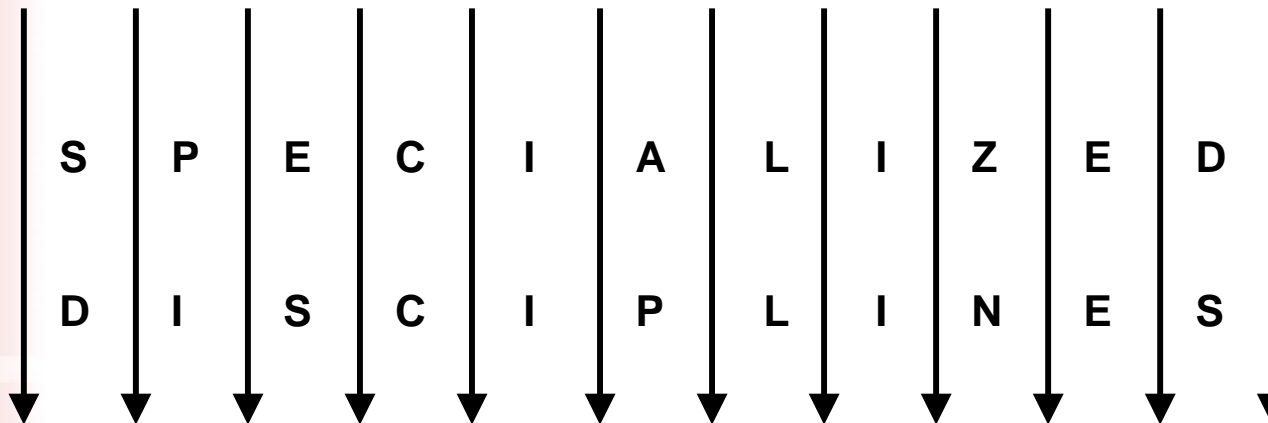
POLICY, STRATEGY, PLANNING, MANAGEMENT INTEGRATION

ENGINEERING INTEGRATION

BUSINESS INTEGRATION

TECHNOLOGY
INTEGRATION

LEVEL OF DEPTH

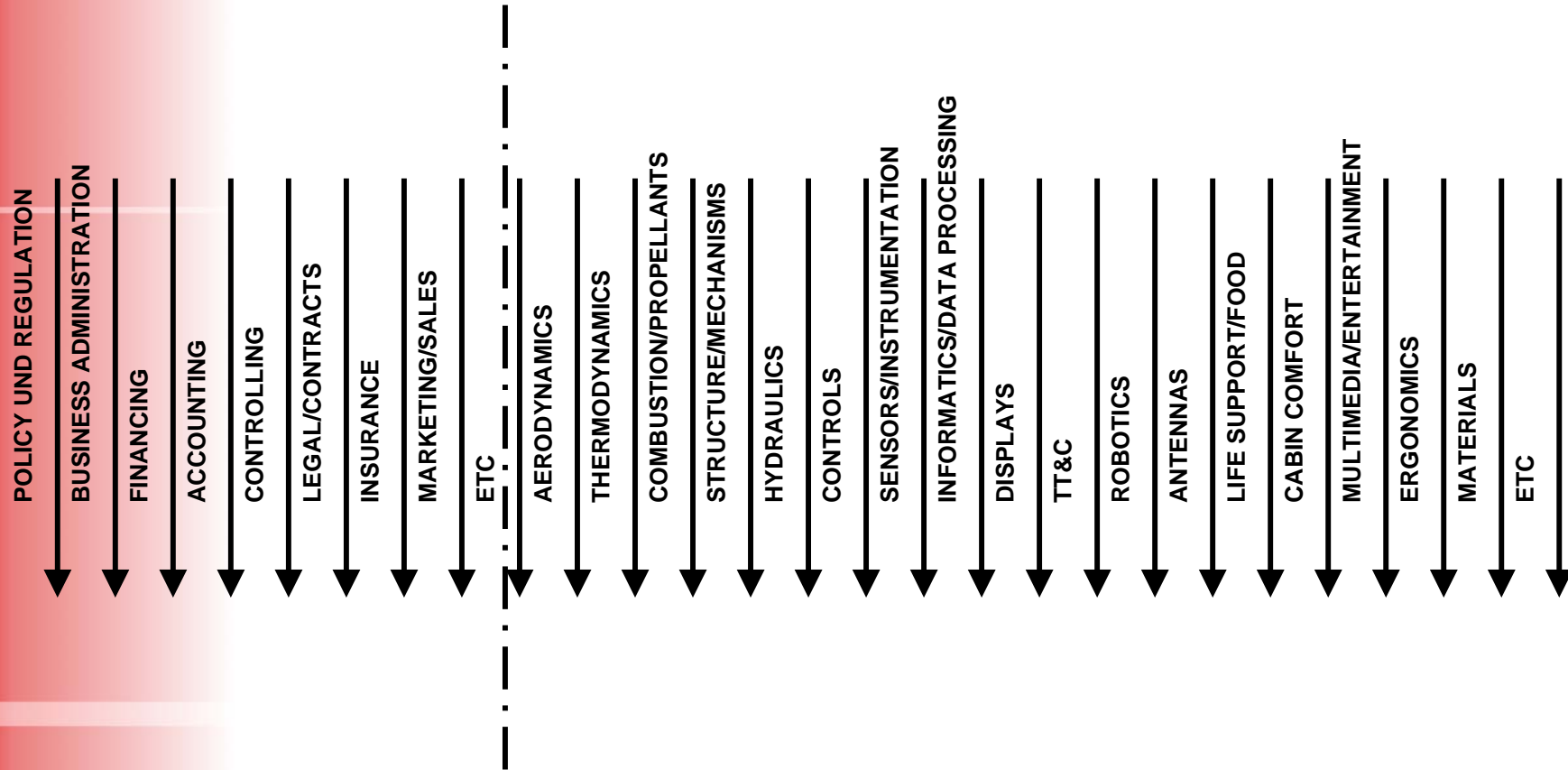


HORIZONTAL SKILLS

VERTICAL SKILLS



TYPICAL SPECIALIST SKILLS IN AEROSPACE

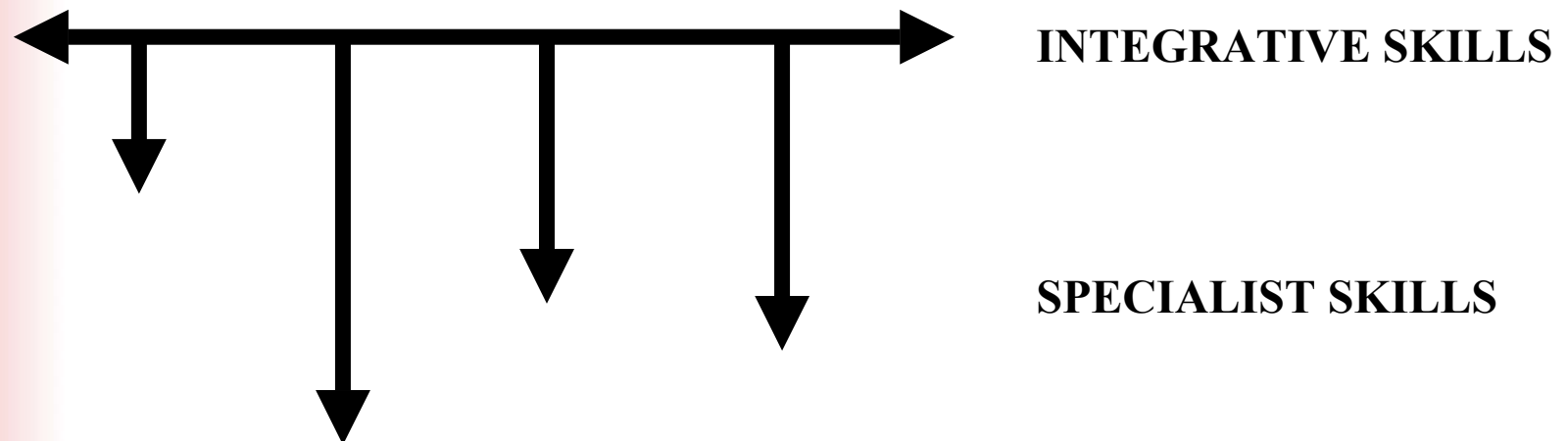




Aerospace engineer – ideal knowledge skills

THE T MODEL OF SKILLS

(FOR A SENIOR ENGINEER OR BUSINESS SPECIALIST)





The „ideal“ education for an Aerospace engineer/engineering manager

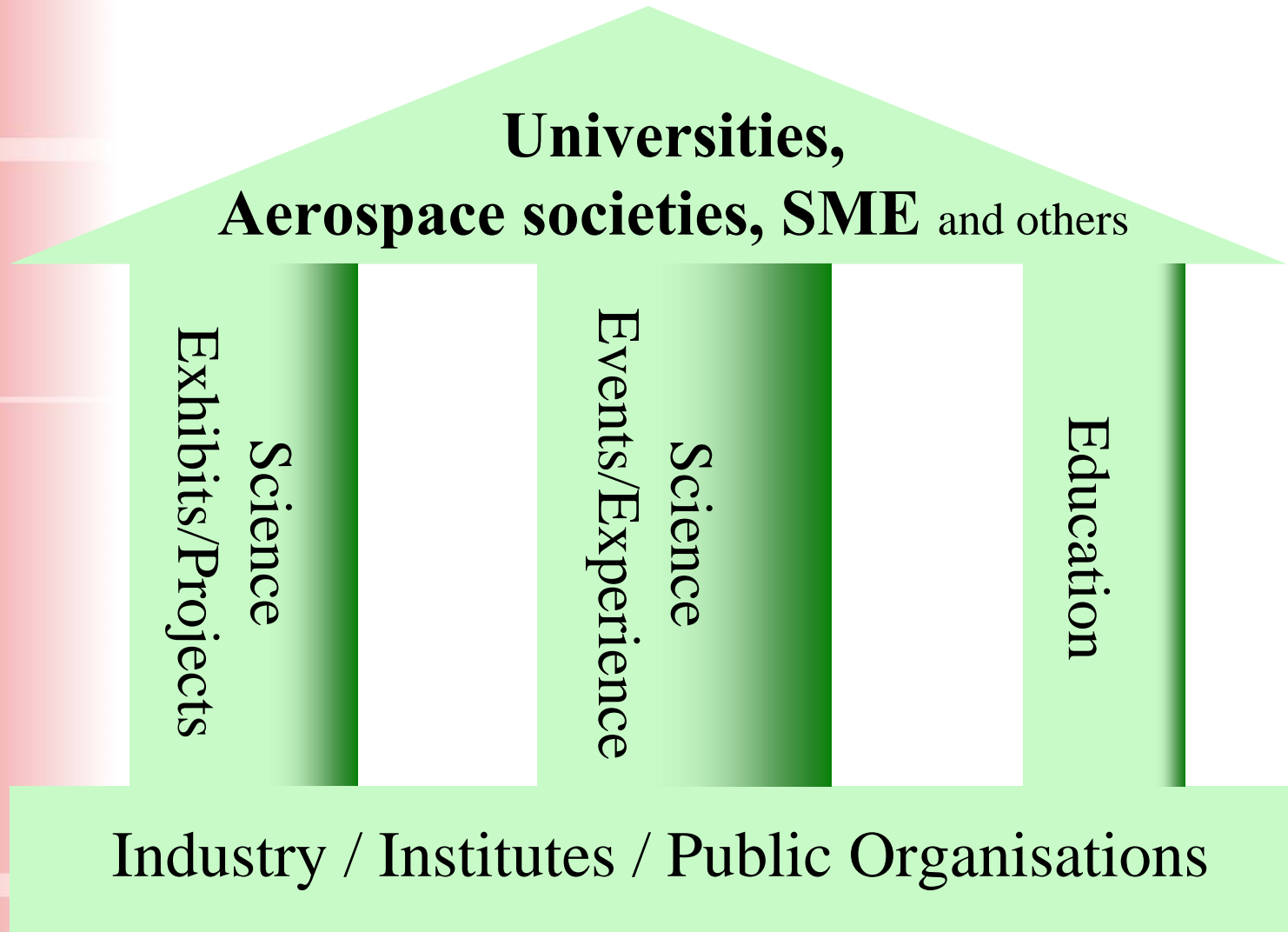
- 1. First University degree in an engineering discipline,
e.g. AEROSPACE, MECHANICAL, ELECTRICAL, PHYSICS, OR
EQUIVALENT**

**part of this education should have been obtained in a foreign country
or an international environment; internships are one or more the major
Aerospace centres in Europe/overseas desirable**

- 2. Yearly short courses in complementary subjects**
- 3. Some 5 years later, a second a „advanced“ degree in SYSTEMS
ENGINEERING, PRODUCT DEVELOPMENT, OR BUSINESS
MANAGEMENT**
- 4. Yearly short courses for knowledge update in related engineering fields
and/or new technologies, business and management**



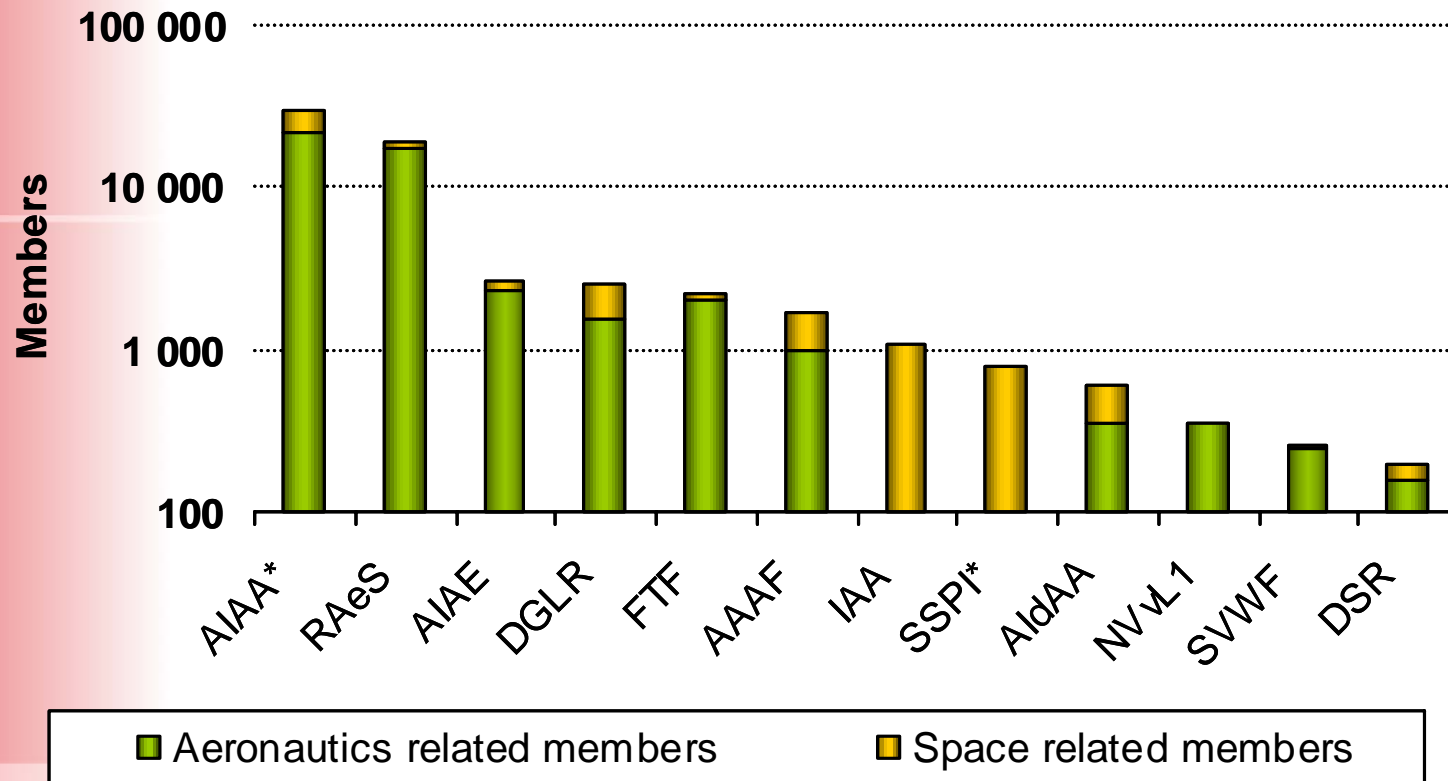
PPP implementation scheme





Membership – private person

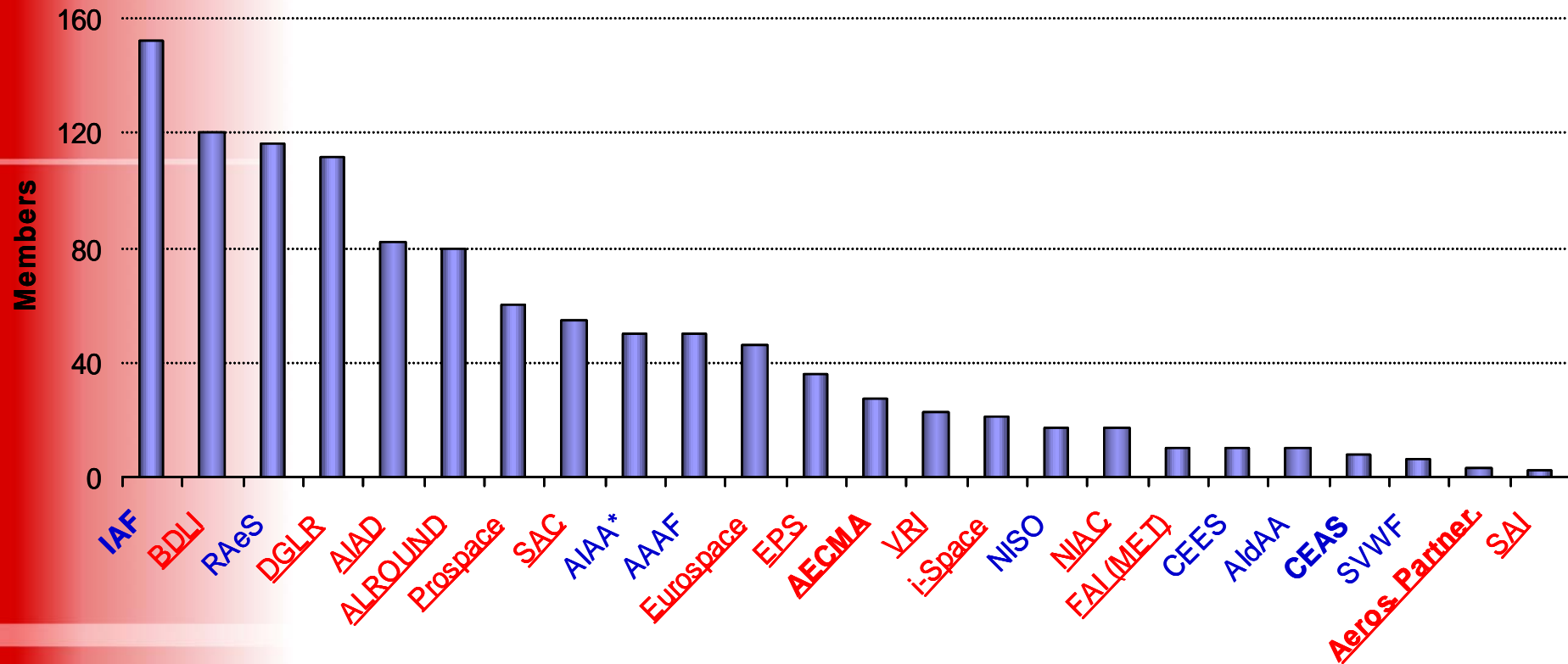
Individual memberships in European and selected US associations (Log scale)





Membership – Industrie/Institutions

Companies and institutions memberships in European and selected US space-related associations





Public Private Partnership Strategies – European implementation projects

- European Research Area Network (ERAnet)
(part of 6th framework program)
- German/European High-level Education Initiative
(Initiative of the German Government/Chancellor Schröder, cooperation with BDLI, EU, ESA, European Aerospace Industry)
- Confederation of European Aerospace Societies (CEAS) (Initiative by all European Aerospace Societies)





European Research Area Network (ERAnet)

Cooperation & Coordination of national and regional Research & Innovation Activities

ERA-Net is a high innovative Component of the 6th Research Supporting Program of the European Union (2002-2006) with an overall budget of EUR 140 million.

Specific Characteristic of this Program is the Support of transnational Networking and Coordination of national Research Programs.

The Participants of the ERA-Net System are therefore Program Manager in national Ministries and Government Aid Organizations and not in Academies/Universities or Enterprises.

**Aim is to forward the Formation of intensive and permanent
Alliances with common Objectives.**



Space Technologies, Applications & Research for the Regions and medium-sized Countries of Europe

- The ERA-STAR Regions Network unites European Regions and ‘smaller’ Countries that have developed Competences in Space Research.
- ERA STAR Regions’ Members include national Ministries and regional Authorities and Agencies responsible for regional Development and Innovation Planning
- The Key Stakeholders are active in promoting and supporting scientific Research and industrial Innovations in the Space Sector that complement European and national Programs.



ERA-Net: partner / partner countries

1. **Ministère de la Region Wallonne (DGTRE); Belgium, Wallonia**
2. **Bavarian Ministry for Economics, Infrastructure, Traffic and Technology; Germany, Bavaria**
3. **Free Hanseatic City Bremen, Senator for Economics and Ports; Germany, Bremen**
4. **Ministry for Traffic, Innovation and Technology; Austria**
5. **Austrian Foundation for Spaceactivities; Austria**
6. **Navigate Consortium; Italy, Lombardia**
7. **Regione Toscana – Direzione Generale Sviluppo Economico; Italy, Toscana**
8. **Netherlands Agency for Aerospace Programmes; Netherlands**
9. **Česká Kosmická Kancelár, (Czech Space Office); Czech Republic**
10. **Hungarian Space Office; Hungaria**
11. **Ministry of Education, Science and Sport; Slovenia**



PPP Education „interactiv“ – some examples



Youth Meeting Point at International Air-Show 2004, Berlin, Germany



PPP Education „interactiv“ – some examples



**1. & 2. Bremen Rocket Launch Day /
European Science Festival**

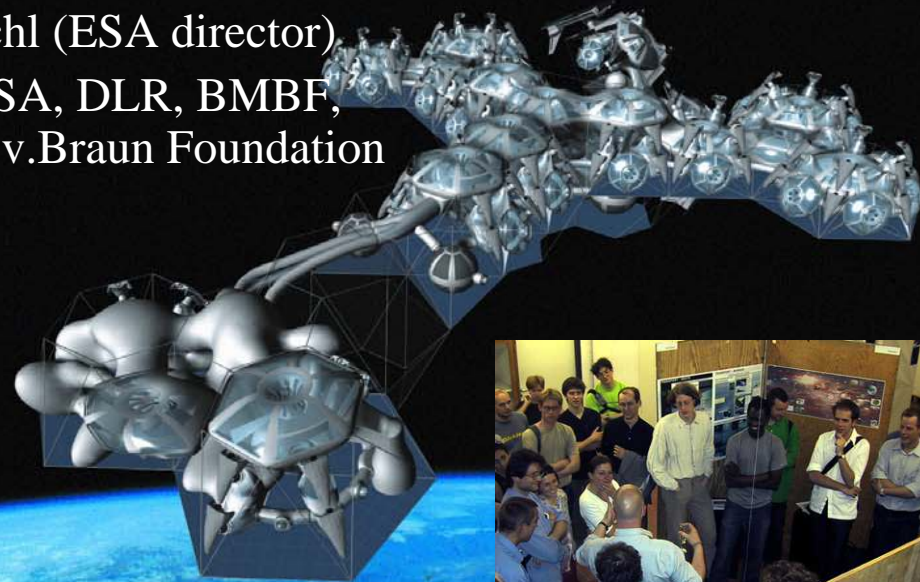
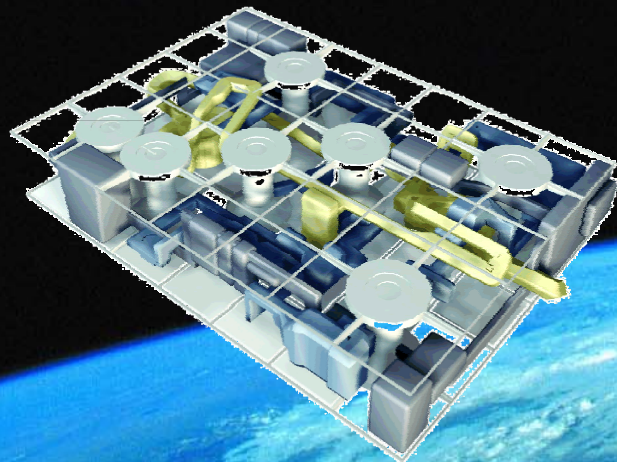


PPP Education „interactiv“ – some examples

Early Bird – www.spacehotel.org



- interdisciplinary (architecture, material science and astronautics)
- Training period – six month (summer term)
- Lectures, seminars, workshops, excursions
- Patronage – J. Feustel Buechl (ESA director)
- Sponsored/supported by: ESA, DLR, BMBF, EADS, W.v.Braun Foundation





Intl. Symposium – „To Moon and beyond“

Bremen, 15. – 16. September 2005

>>> www.beyondmoon.de

DGLR International Symposium
To Moon and beyond

Political and scientific needs for a new Space Exploration Initiative

► 15 - 16 September 2005 Park-Hotel Bremen, Germany

Organised by: DGLR Deutsche Gesellschaft für Luft- und Raumfahrt - Lilienthal-Oberth e.V. www.beyondmoon.de

Sponsored by: **EADS** TRANSPORTEN **DHB SYSTEM** Airline Technology AG Company **machtwissen.de** **big** Big Bremen One aviation, Airport Center





PPP Education „interactiv“ – sports competition



Arianecross 2005
Bremen, 25. – 27. Juni 2005





Thank you for your attention!

www.machtwissen.de

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