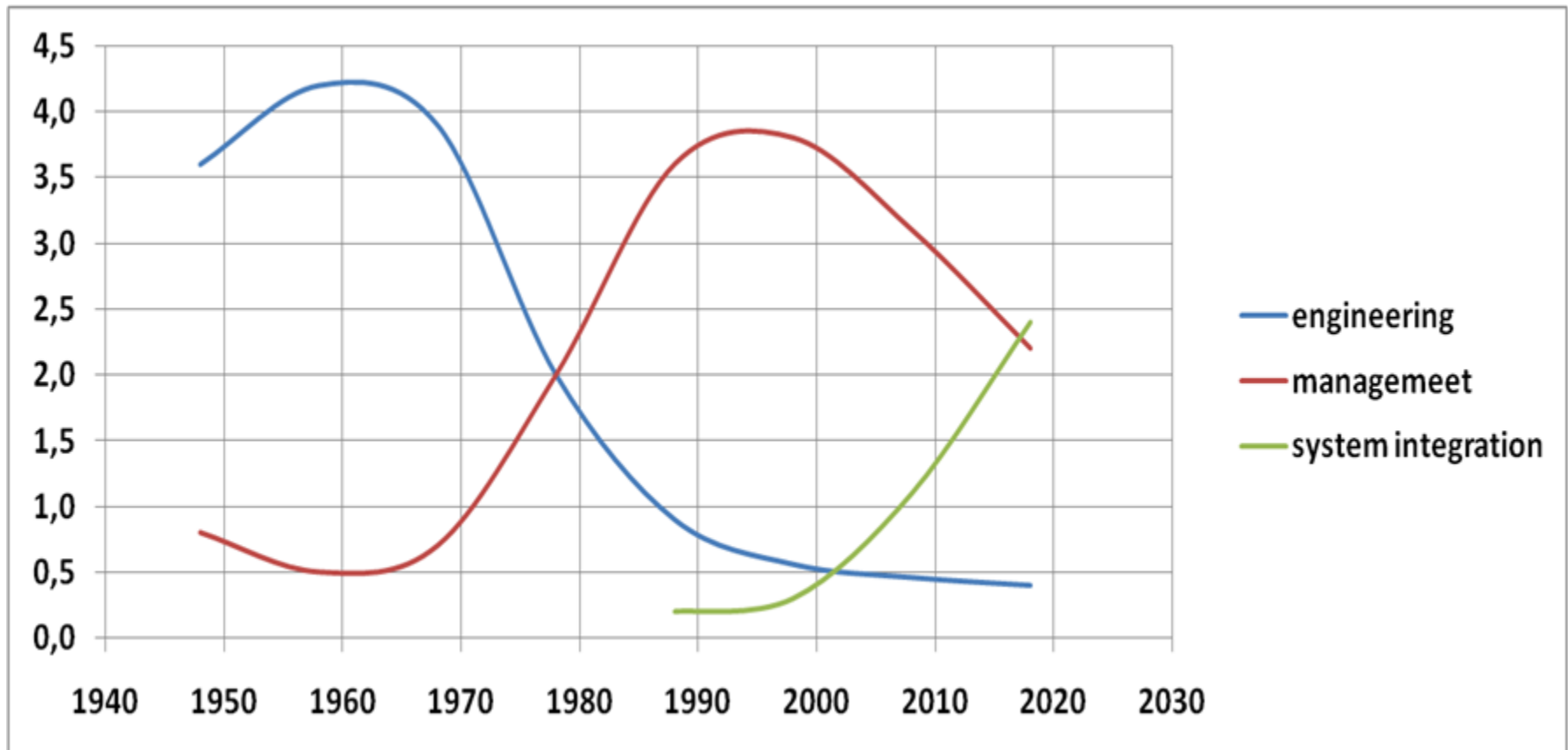
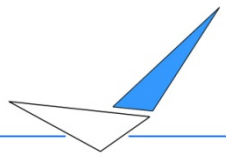


The aviation as the complex system in transition

Role of leaders in profitability





EASN Technical Workshop

Athens, Greece, on the 23rd of March 2009



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Department of Aircraft and Ships
Budapest University of Technology
and Economics

Actual problems and Interest Groups in European aeronautics



Introduction

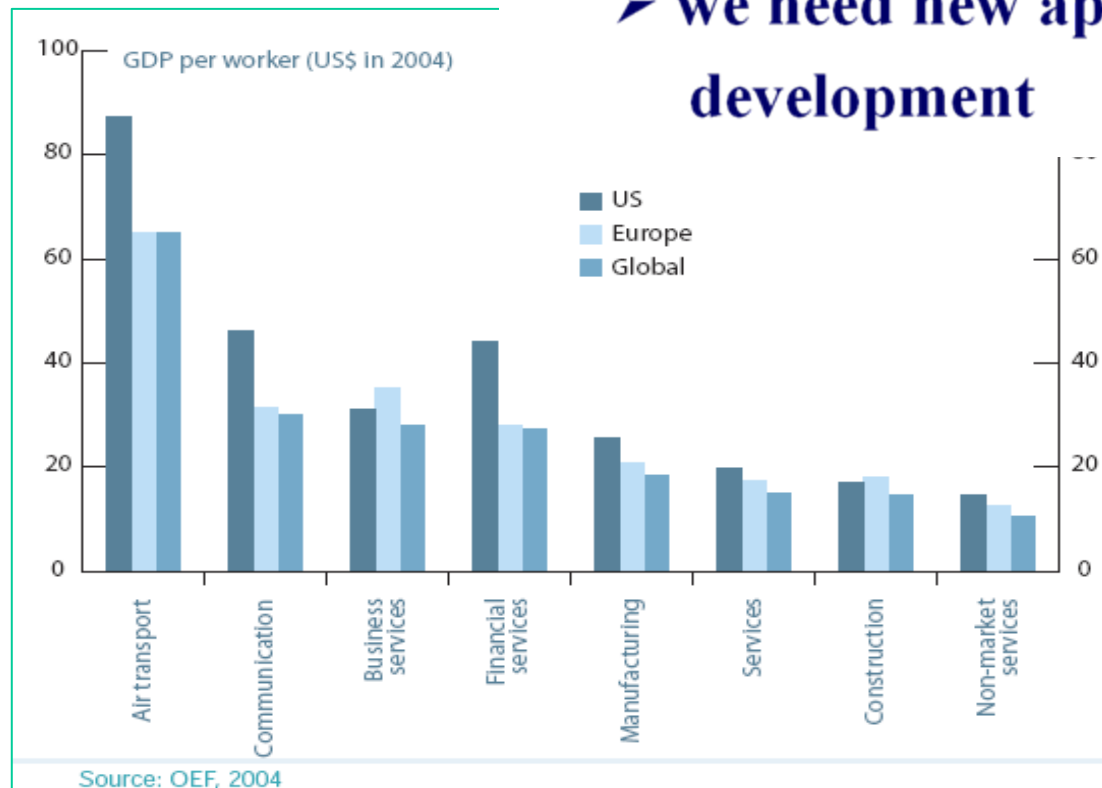
1. Transition period
2. Goals of the Interest Groups
3. Anomalies in the EU FP
4. Recommended IGs

Conclusions



Introduction

- **aeronautics is the most capital intensive business**
- **air transport in transition**
- **technology development is accelerating**
- **we need new approach in technology development**



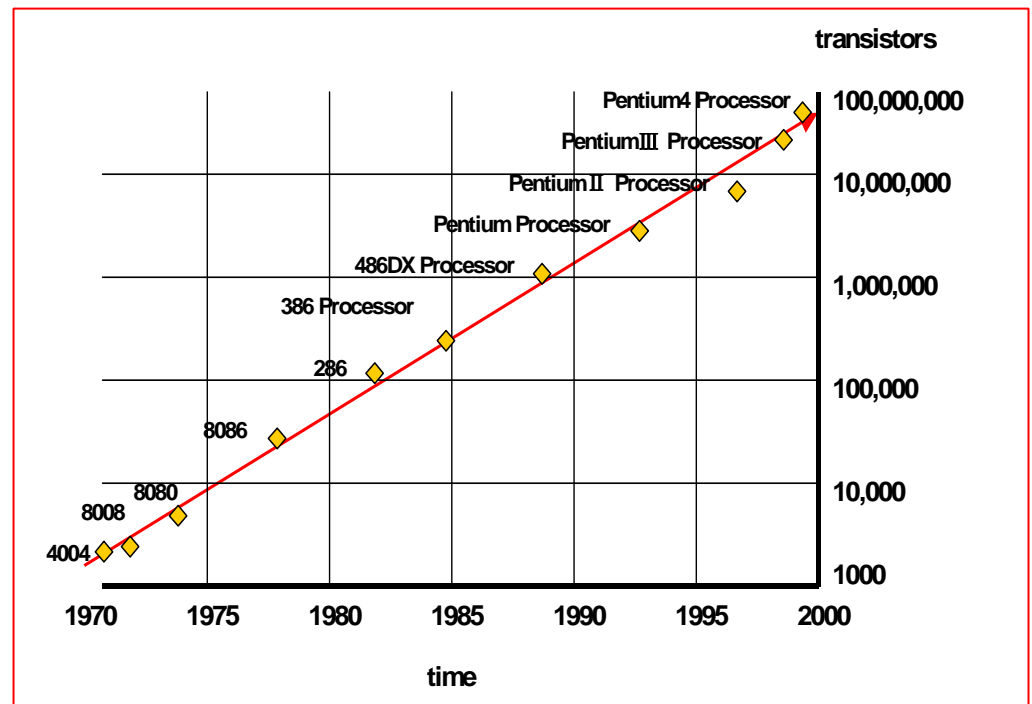


1. Transition period

1.1. Technological underpinnings

From B. J. Holmes: Transformation in Transportation Systems of the 21st Century, Invited lecture on the ICAS Congress, 2004, Yokohama

1. Moore's Law on microprocessor cost/performance
2. Gilder's Law on bandwidth performance
3. Metcalf's Law on network performance
4. The unwritten law of abundance
5. The unwritten rule of gridlock
6. Kurzweil's Law of Accelerating Returns
7. The Golden Rule of the information age





1. Transition period

1.2. Characteristics of transformation

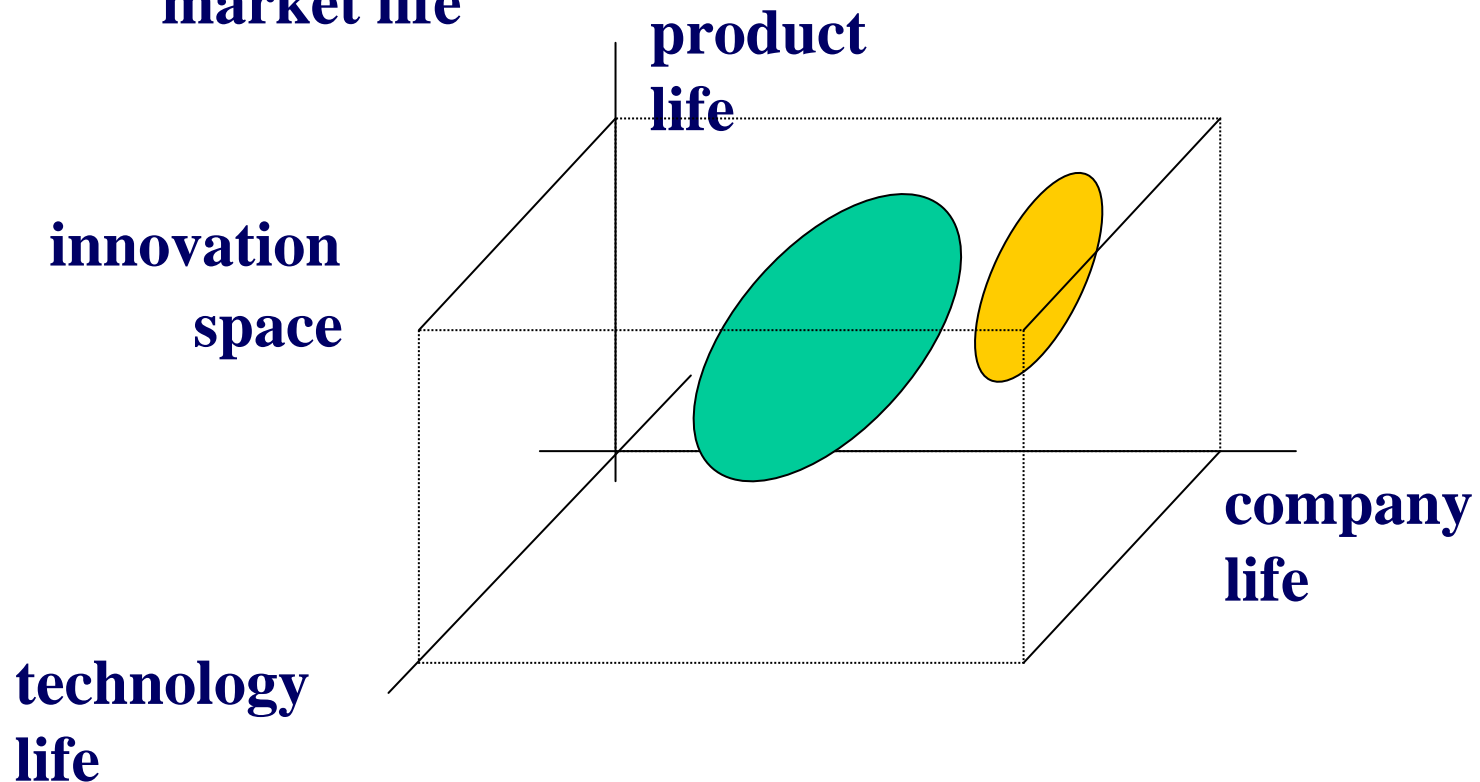
System	20th Century	21st Century
Communication	Analog, Voice, Shared Frequencies	Digital, VXML, Addressable
Airport networks	Hub-and-Spoke	Widely Distributed
Air Traffic Services (Separation and Sequencing)	Ground-Centric	Airborne-Centric
Air Transportation Services	Scheduled	On-Demand
Air Crews	Two-Pilot	Single-Pilot Un-Piloted
Network Tools	Linear	Non-Linear
Cargo & Package Delivery	High-density markets, next-day service	Thin markets, same-day service
Economic Opportunity	Centralized	Diffused
System Responsiveness	Brittle	Resilient
System Growth	Constrained	Scalable (Up or Down)



1. Transition period

1.3. Technology life evaluation

- technology life evaluation
- transit from 2D roadmap to 3D innovation space
- even introduce the 4th coordinate: market needs, market life



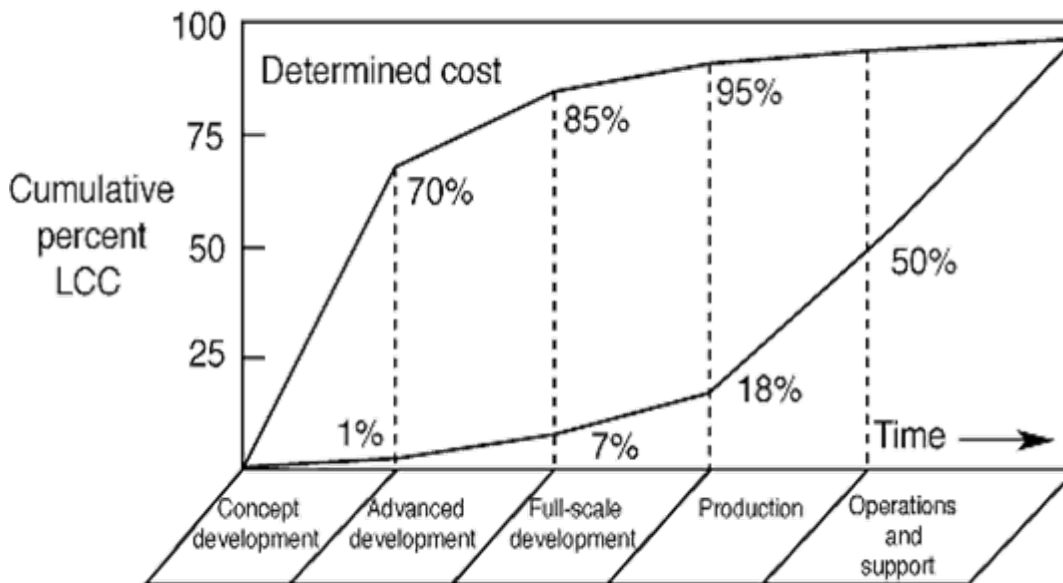
2. Goals of the Interest Groups

2.1. Networking required

5. Generation innovation process

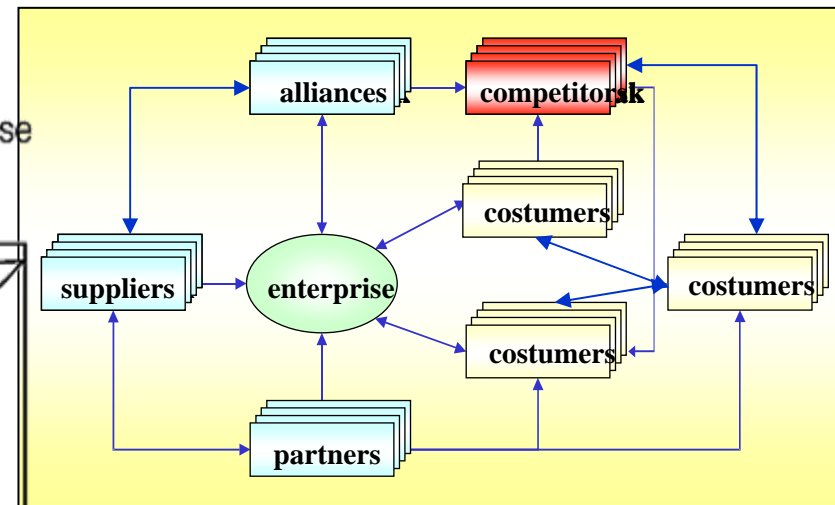
System engineering

Life cycle-cost committed versus incurred by life-cycle phase
(Ballistic missile system)



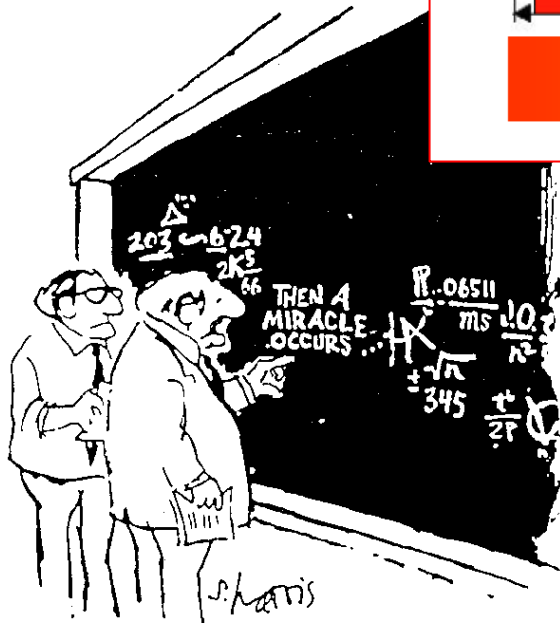
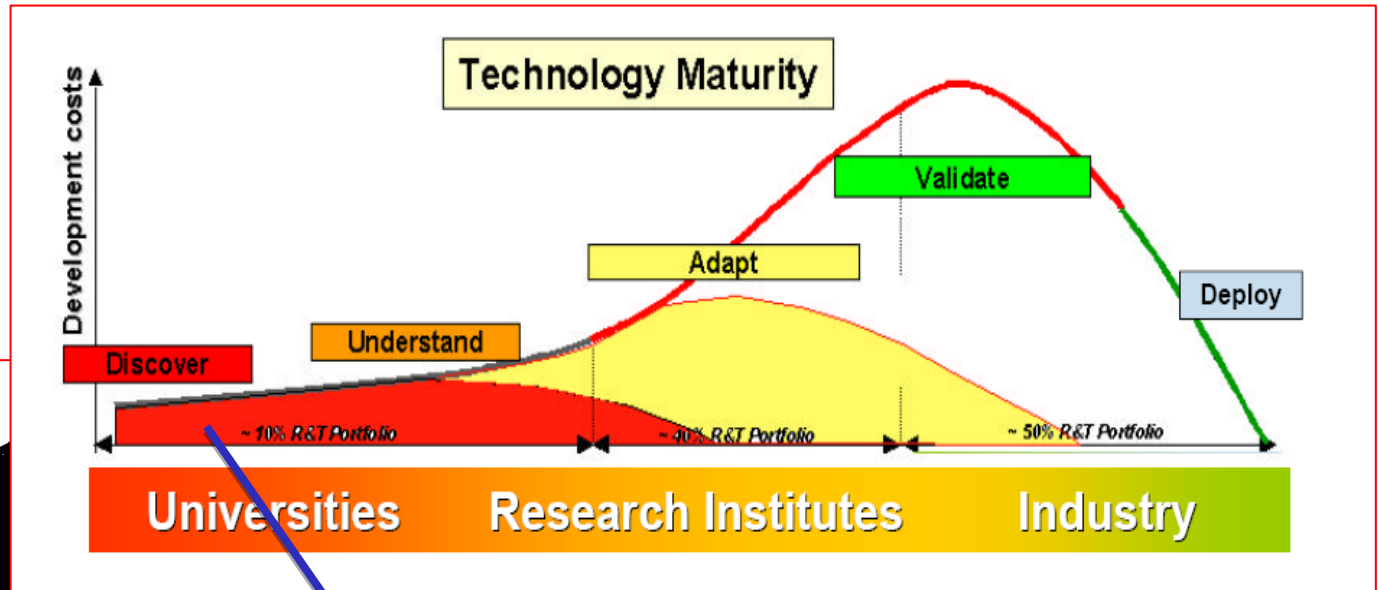
Source: Boeing Company

Leverage in the development process.



2. Goals of the Interest Groups

2.2. The goal



"I think you should be more explicit here in step two."
(Scientific American)

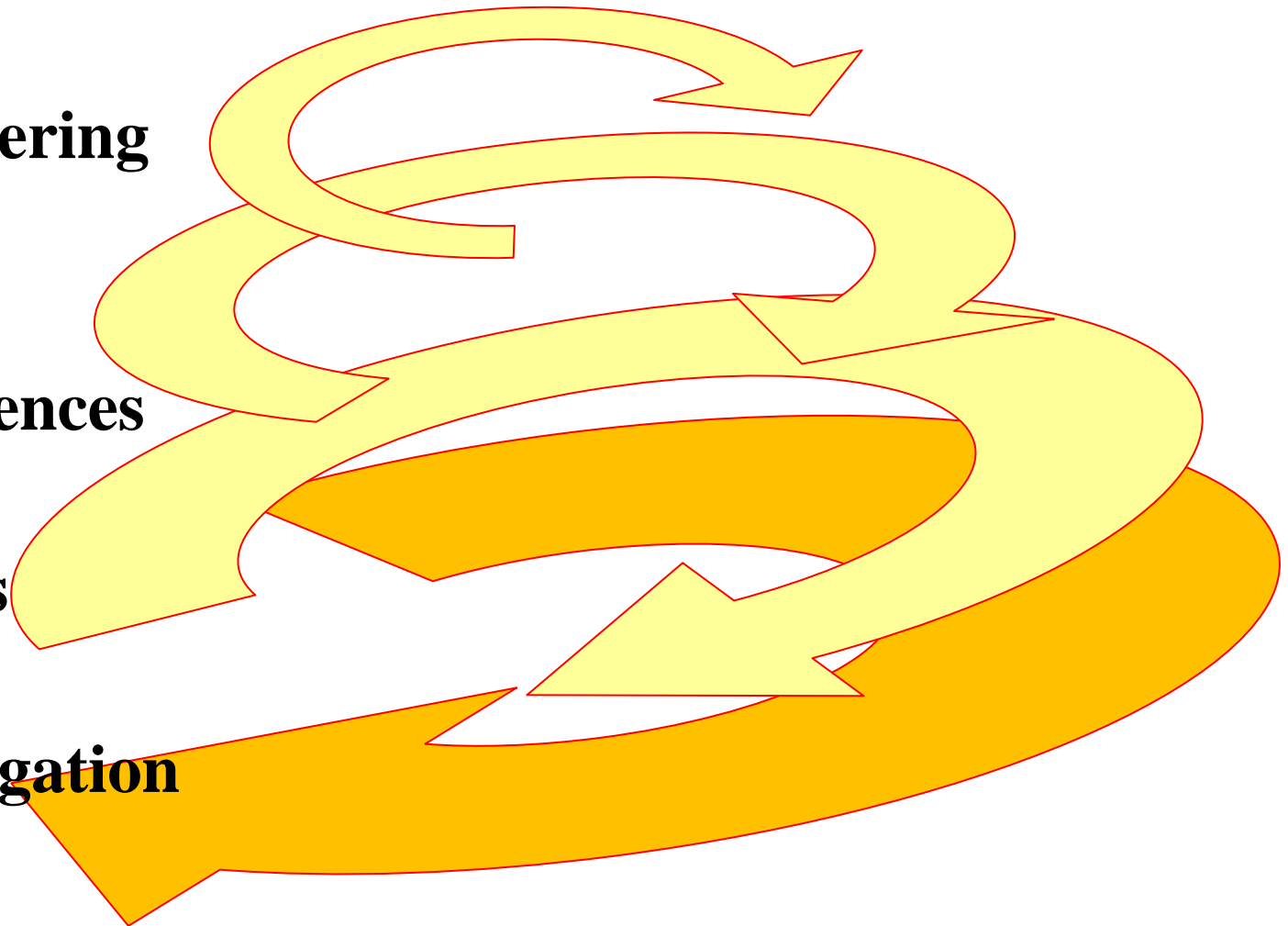
**Creating new ideas and initiating
their investigations**



2. Goals of the Interest Groups

2.3. Role of universities in development

**product
engineering
practical
experiences
laboratory
studies
theoretical
investigation**





3. Anomalies in EU FP

- general goal (Lisbaon strategy) defined well
- SRA is too general
- interest of big players
- some fields are missing (like small aircraft as new business area or MEMS technology application)
- pioneering in words only
- evaluation is `controlled` (scores are subject to change)
- evaluating of the application contributed with use of 5 – 7 manmonths is evaluated by 2 persons during some hours
- giga projects – role of EU is moved to big players



4. Recommended IGs

4.1. Two early IGs

PATS - Personal Air Transportation System

**initiated by us (scientific committee of the series of
International Conferences on the Unconventional
Flight Analysis**

published on ICAS 2002 already

some projects are connected with it (EPATS)

Aircraft Avionics, Systems and Equipments

we were ask to organised such IG

**some meetings were realised for definition of the
project ideas**

**WE WERE ASKED DO NOT INITIATE
APPLICATIONS!**



4. Recommended IGs

4.2. Pioneering technology

**Gabriel - Integrated Ground And on-Board system
for support the aircraft safe takeoff and Landing
partners are defined
first application received 12.5 points**

**New certification technology for reduction the time
to market**

**Goal: development of the technology (standard) manual for
testing the new creative and innovative ideas for decreasing
the preliminary testing and evaluation time.**

**In result we will have a series of tested technologies ready
for implementation**



4. Recommended IGs

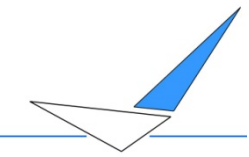
4.3. Solving the actual problems

Proposal title: in-flight emergency situation assessment

Goal: development of the new approach to the in-flight emergency situation assessment

Task to be solved:

- **Investigation and specification of the in-flight emergency situations**
- **Development of the new approach to the in-flight emergency assessment technology**
- **Detailed development of the manual for in-flight emergency situation assessment,**
- **Initiating the pilot project for testing the in-flight emergency assessment technology.**



4. Recommended IGs

4.3. Solving the actual problems

Proposal title: Surface Morphing Method for Wing Optimisation

Goal: The goal of the research is to develop a CFD (Computational Fluid Dynamics) and inverse design strategy based morphing method for the adaptive optimisation of wing surface at different flight condition.

Task to be solved:

- Developments and programming of CFD based optimization method.
- Validation of the CFD code and the optimization procedure.
- Application of the morphing method for the wing surface at different flight condition.



Conclusions

EASN – is a tool of improving the activities of universities in EU FP aeronautical projects

It must find his role in EU FP supporting processes

IGs are key elements of the EASN.

Igs can find their role if they will work regularly and without EU support, too.

Igs can apply for university staff exchange or other small support.