Supporting Action: EU 7th Framework Program AAT-2010-RTD-1, Project Nr.: 266249
Coordinator: Altran Switzerland
Consortium partners:
EADS Innovation Works (FR/DE), Carl Zeiss (DE), Altran (F + BE) and ABB / Micos (CH)

INNOVATION MANAGEMENT SW PLATFORM FOR AERONAUTICS
A web based tool
Project Scope and Objectives
Background – Predecessor Projects

Out of the box (ACARE\(^1\) Study 2006-2007)

- Objective: identifying innovative, discontinuous, revolutionary and radical concepts and technologies for air transport of the future.

- Phase 1: creative ideas and concepts were identified (100 ideas)

- Phase 2: ideas were assessed based on their feasibility in terms of customer acceptance, economics, efficiency and technologies:

  Six promising ideas:
  - sustainable propulsion concepts
  - the use of ground power to increase the efficiency of flying
  - autonomous guidance and control for air vehicles
  - personal air transport systems
  - novel ways to connect people with aircraft
  - the concept of the airborne cruiser and its feeder aircraft

- Benefits: a more structured approach for thinking about radical changes in Air Transport on a European level.

\(^1\)ACARE: Advisory Council for Aeronautics Research in Europe
Project Scope and Objectives

Background – Predecessor Projects

CREATE (FP7 Project, 2008-2010)

- Objective: Design and implement a process to collect and assess innovative ideas for the future of air transport (2040 and beyond)

- Novel ideas will be collected through a workshop and the voluntary stakeholder contributions via a WIKI type of website:

  Innopedia - the wiki for ideas in Aeronautics & Air Transport: http://innopedia.wikidot.com

- Project activities:
  1. Technology Watch
  2. Idea Generating Workshop
  3. Merging of Ideas
  4. Assessment of Ideas
  5. Internet based aeronautics WIKI
  6. Incubation of Novel Ideas
Expected impact:
The platform should demonstrate the ability to identify, assess, nourish and facilitate the development of breakthrough technologies and concepts that could become operational towards the second half of this century.

Scope:
The platform should go beyond the proof of concept developed in the CREATE project by actually performing the implementation and operation of the comprised elements.
The newly developed software-based innovation platform for aeronautics and the associated launch & real case application with industrial partners shall lead to:

- Increase in innovation efficiency (goal-oriented, systematic and model-based approach to innovation => breakthroughs)
- Business process integration of innovation process & platform (work-flow, dashboard)
- Fostering continuous and process-flow based collaboration between stakeholders: user communities!
- Establishing a database to efficiently manage knowledge

Achieve and keep innovation leadership in Europe (sustainable innovation, based on incremental and breakthrough changes)
How to achieve “Sustainable Innovation Cycles” & Breakthroughs

Assure

“Continuity of S-curves” and Transitions with clear Created Value
How to achieve “Sustainable Innovation” and Breakthroughs

Innovation needs to be “well-timed”; too fast can be bad as well!
How to achieve “Sustainable Innovation” and Breakthroughs

Market Need vs. Voice of the Customer

“If I had asked people what they wanted, they would have said faster horses.” - Henry Ford
Famous Historical Examples of Break-Throughs (Disruption)

Electric Cars vs. Combustion Engine Cars (1900)
Gas-Bulbs vs. Electric Bulbs (Edison)
Ice Harvesting vs. Freezers
Conventional (AgCl) vs. Digital Photography (Kodak => ...)
Conventional Disks vs. Laptop Harddisks (IBM => Hitachi)
Propeller vs Jet Engine
Electrical vs. Optical Communication

Discussion:  Anticipated Market Y/N ?  VoC Effective Y/N ?
Innovation in Aeronautics
Europe

1969

1987

2005

2009
To achieve continuous and successful (sustainable) innovation in a company, several aspects and factors play a crucial role; all must be effective.

**FIGURE 16: Success factors in each dimension of A.T. Kearney’s “House of Innovation”**

- **Innovation strategy**
  - Create clear vision for innovation aligned with business strategy
  - Communicate to all hierarchies
  - Analyze all environmental trends (e.g., customers, competitors, technologies)
  - Measure achievements against strategic objectives

- **Innovation organization and culture**
  - Provide time, space and money to exploit new ideas
  - Support and active involvement from top management
  - Build excitement about innovation
  - Accept failures and mistakes
  - Involve internal and external resources

- **Innovation life-cycle management**
  - Establish incentive systems to support IM activities
  - Ensure sound project management and control of resources
  - Ensure systematic management of IPR
  - Apply appropriate IT tools for IM tasks
  - Integrate lessons learned and knowledge sharing

- **Idea management**
  - Create systematic idea generation and innovation processes
  - Turn lots of new ideas into innovation projects
  - Build continuous improvement processes
  - Accelerate time-to-market/time-to-profit

- **Product/process development**

- **Launch/continuous improvement**

Source: A.T. Kearney 2006
“If you can dream it, you can do it.”
Walt Disney

“If at first, the idea is not absurd, then there is no hope for it.”
Albert Einstein

Creative Thinking

“Apparent Irrelevance”

High Level of ABSURDITY APPARENT IRRELEVANCE Creative Thinking

“If you can dream it, you can do it.”
Walt Disney

“If at first, the idea is not absurd, then there is no hope for it.”
Albert Einstein

Level of Creativity in Solution

Low Old Solutions New Solutions

Level of Speculative Thinking in Original Idea

THINK HARDER DIVERSITY WISHING ANALOGY/ METAPHOR ABSURDITY APPARENT IRRELEVANCE
Creativity: “Wishful Thinking” (Polaroid)

The creativity continuum

<table>
<thead>
<tr>
<th>PARADIGM PERSERVING</th>
<th>PARADIGM STRETCHING</th>
<th>PARADIGM BREAKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Safe”</td>
<td>Could be viewed as “unsafe”</td>
<td></td>
</tr>
<tr>
<td>Use of imagination not necessary</td>
<td>Use of imagination necessary</td>
<td></td>
</tr>
<tr>
<td>Not necessarily expressive</td>
<td>Expressive</td>
<td></td>
</tr>
<tr>
<td>Free association</td>
<td>Fantasy or unrelated stimuli</td>
<td></td>
</tr>
<tr>
<td>Can be used by experienced and inexperienced groups</td>
<td>Should only be used by experienced groups</td>
<td></td>
</tr>
<tr>
<td>Brainstorming</td>
<td>Object Stimulation</td>
<td>Wishful Thinking</td>
</tr>
<tr>
<td>Brainwriting</td>
<td>Metaphors</td>
<td>Rich Pictures</td>
</tr>
</tbody>
</table>

Source: McFadzean (1996a)
Lead Users (LU) Approach: Method (Eric von Hippel, MIT); Power of User Communities

Figure 2: Distinction between lead user innovation and innovative ideas from customers
Human Factors

It is crucial to provide also:

• Cross-functional Teamwork

• Incentives (innovation-shares, rewards)

• Motivation (roles, responsibilities, teams)

• Training (Creativity, Innovation)

• Facilitation (communication, exchange of information)

Innovation must be FUN!
Altran Innovation Processes Model: Analogous to CMMI & NPDP, with Innovation Management KPI Dashboard
A web based platform to support Innovation Management and to facilitate breakthroughs

- **Tailored to Aeronautics**: Incorporate industry-specific requirements, structures and priorities: Categories and KPIs
- **Feedback Loops**: To capture project and process feedback (incl. „negative knowledge“), rebuttable review process
- **KPI’s and Process Dashboard**: Work-flow based
- **Based on systematic Innovation Management Process**: Boosting creativity
- **Working based on systematic Innovation Management Process**: Higher success in radical ideas + planning / execution

- **For Innovators:**
  - Methods for generating ideas
  - A pool for sharing ideas and getting inspiration
  - An environment to find collaborators and work together on an idea
  - A clear path to promote an idea and turn it into a project within the organization
- **Additionally, for Managers:**
  - Idea calls
  - Spot talents and ideas
  - Control over the process
- **Additionally, for Executives:**
  - Transparent Idea Promotion Process
  - Involvement at all levels in the organization
  - Assurance of a methodic Generation, Maturation, Assessment process prior to submission for Selection

- **Guidelines for Innovation Techniques**: Generic portfolio of tools & descriptions
- **Collaborative Work**: Different people working on the same content asynchronously
- **Technology Watch**: Track environmental changes, emerging technologies etc.
Altran Innovation Processes Model + FP7 SW Platform

Idea Generation (Multiple methods)

Assessment Results

Initial Screening and Advanced Idea Assessment

Strategic Selection

Actual Feasibility Demonstrated: Product (Function, Performance), Manufacturing, Quality

Evaluation Board / Mgt.

New Product Development (NPD)

Innovation Generation, Identification, and Optimization Process Chain

Experts Internal/External

Product Development

Manufacturing

Marketing

Cross-functional team

NPD Process

Actual Feasibility Demonstrated:
Product (Function, Performance), Manufacturing, Quality

Capture rejected ideas & reasons → Idea Pool

YES

Innovation failure (Development)

Final Assessment (customers, market)

Feedback

NO

NO

YES

Monitoring Product/Technology Portfolio

Feedback from new and existing projects

Follow up Process

Tracking of environmental changes (market, needs, technology changes)

Schedule repeated Idea assessment

Re-Evaluation Process

Information Management System (IMS)

YES

Cross-functional team

Idea Pool

Technology Watch

YES

Capture ideas

Initial Screening and Advanced Idea Assessment

Assessment Results

Strategic Selection

Innovation Projects

Monitoring Product/Technology Portfolio

Feedback from new and existing projects
Main Concept
- Promotion of Ideas
  - Internal knowledge
- Articles
- Ideas (more or less mature)

Content Database (Main Items)
1. Innovation Guidelines
   - Help & Reference
2. KPI Dashboard / Configure Process

Process Control
- Control
- Assign Users to tasks
- Validate Idea
- Evaluate, Review Idea
- Create & Categorize Idea
- Comment & Discuss Idea
- Add, Edit Idea

Owner and contributors:
- Add, Edit Idea
- Evaluate, Review Idea

Any User:
- Create & Categorize Idea

Idea Managers (IM's):
- Control the Process
- Assign Users to tasks

All Users:
- Comment & Discuss Idea

Information flow
Innovation Methods: from TRIZ

Trends of Evolution, Ideal Final Result, System-Function Analysis
An analysis of 3 million patents shows that all systems follow a limited number of technical trends & inventive principles to evolve => Breakthroughs

TRIZ: Ideal Function & IFR

Ideal Final Result

...to obtain maximum value
## Project Plan

**Where do we stand now?**

### Project Management (WP12)

#### Preparation

<table>
<thead>
<tr>
<th>Negotiation</th>
<th>Grant Agreement (Oct./Nov. 2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WP1: Kick-off</strong></td>
<td>Agreement on Scope and Plan (Nov. 2010)</td>
</tr>
</tbody>
</table>

#### Requirements

<table>
<thead>
<tr>
<th>WP2: System Requirements (Innovation)</th>
<th>Draft SRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP3: System Requirements (Aeronautics)</td>
<td>Full SRD</td>
</tr>
<tr>
<td>WP4: Software Requirements</td>
<td>Full SRS</td>
</tr>
</tbody>
</table>

#### Platform Development

<table>
<thead>
<tr>
<th>WP5: SW Architecture</th>
<th>GUI, PDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP6: SW Design</td>
<td>FSDD &amp; Software test plan STP</td>
</tr>
<tr>
<td>WP7: Coding &amp; Unit Test</td>
<td>Unit tested SW code</td>
</tr>
<tr>
<td>WP8: Component Integration &amp; Testing</td>
<td>Stable SW baseline, user manuals</td>
</tr>
<tr>
<td>WP9: System Testing</td>
<td>Acceptance test, release</td>
</tr>
</tbody>
</table>

#### Implementation

<table>
<thead>
<tr>
<th>WP10: Workshops</th>
<th>Real-case Innovation Themes, Evaluated Ideas for Breakthroughs in Aeronautics</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP11: Dissemination</td>
<td>SW Platform accessible to partners, selected universities, FP7 aeronautical community, promotion plan</td>
</tr>
</tbody>
</table>
Summary: Innovation Management SW Platform

- Innovation Management Process that is Work-Flow based
- Integrated Ideation, Maturation & Assessment
- Integrated Feedback-Loops, also for Innovation Failures
- Know-How Management System with integrated Document Management
- Creativity & Innovation Guidelines (TRIZ, Lead Users etc., tailored to breakthrough innovation)
- Technology Watch (Push & Pull Concepts)
- Dissemination / Use of large User Communities

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- Andrew Koubatis
- Jose Barros
...a global creativity and innovation firm that helps premier organizations:

Gain rich customer insights
Develop innovative solutions
Revitalize vision and strategies
Develop new products
Rejuvenate brands and marketing campaign
Implement business process innovation
 Accomplish key mandates where fresh thinking and collaborative action are needed
Build capability for creativity and innovation

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Service Portfolio Altran Switzerland
Complementary Offers – Technology, R&D and Innovation Consulting

Altran Innovation Management

- Ideation
- Screening
- Strategic Selection

Comprising of
- Systematic innovation management process approach
- Integrated feedback loops from each lifecycle stage
- Dashboard to view and evaluate performance

Fills a need for Innovation Process Mgmt.
- Promotes cross-selling of complementary solutions

Altran supports and enhances new product development (NPD) to end of the process chain with
- information systems
- applications & competencies

Altran NPD Offers & Customization

- New Product Development (NPD)
- Commercialization
- Market Assessment & Product optim.
- Retirement

Business Intelligence, ERP, CRM, etc.

Idea Management

Innovation Management

Product Lifecycle Management (PLM)
Change Status Example

- Evaluation schedule
- Ideas
- Select Idea
- Change status
- Assign to "Innovation projects"
- Enter Reason
- Assign to "Rejected Ideas"
- Accept
- Reject

Re-evaluate Idea

- Rejected Ideas
- Select Idea
- Add/Change documents
- Add comments
- Add/Change Follow-up
- Add/Change Assessment Rule
- Save Changes
- Schedule Reevaluation
- Evaluation schedule
- Change Status
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