Innovation in the Aerospace & Defence Industry - A European Perspective

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EADS Chief Technology Officer

Yokohama, September 1, 2004
“It is not the strongest of the species who survives, not the most intelligent, but the one most responsive to change”

Charles Darwin
About Innovation

Innovation is a key process

Innovation is not just about technology

Innovation

Product  Process  Organisation  Market  Financial
The Company

Date of foundation: July 10, 2000
Foundation companies: Aerospatiale Matra SA
CASA (Construcciones Aeronáuticas SA)
DaimlerChrysler Aerospace AG

EADS Capital Structure
as of December 2003

EADS today is the second-largest group in the global aerospace and defence industry, with a unique range of products and services
### Revenues No. 2

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenues</th>
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<tbody>
<tr>
<td>EADS</td>
<td>€ 179.3 bn</td>
</tr>
<tr>
<td>Boeing</td>
<td>€ 44.8 bn</td>
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<tr>
<td>LM</td>
<td>30.1</td>
</tr>
<tr>
<td>Thales*</td>
<td>10.6</td>
</tr>
<tr>
<td>Ford**</td>
<td>6.3</td>
</tr>
<tr>
<td>Saab</td>
<td>3.3</td>
</tr>
<tr>
<td>L3</td>
<td>4.5</td>
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### Orderbook No. 1

<table>
<thead>
<tr>
<th>Company</th>
<th>Orderbook</th>
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</thead>
<tbody>
<tr>
<td>EADS</td>
<td>1st</td>
</tr>
<tr>
<td>Boeing</td>
<td>3rd</td>
</tr>
<tr>
<td>BAE</td>
<td>4th</td>
</tr>
<tr>
<td>LM</td>
<td>3rd</td>
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<tr>
<td>Thales**</td>
<td>2nd</td>
</tr>
<tr>
<td>Saab</td>
<td>1st</td>
</tr>
<tr>
<td>L3</td>
<td>2nd</td>
</tr>
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</table>

*Reported backlog of firm contractual orders
**Thales & Ford backlogs are estimated

### With leadership in all segments

- **Commercial Aircraft (Airbus)**
- **Helicopters (Eurocopter)**
- **MTA**
- **Military Aircraft**
- **Satellites (Astrium)**
- **Missiles (MBDA, LFK)**
- **Commercial Launchers (Ariane)**

EADS: A Global Leader ....

2003 figures for Aerospace & Defence activities

ICAS 2004
Yokohama, Sept. 1, 2004
New Market Opportunities …

Defence companies must adapt to new service opportunities

Traditional Defence Business Model must be aligned to the new form of customer demand

Higher competition, as market is open to other non-defence companies

... and growing demand for providing new financing options

Growing Market Potential

For outsourced military services and increasing governmental demand for PPP/PFIs (Public – Private Partnerships/Private Finance Initiatives.)
Innovation in EADS through Research & Technology:

**One core of the company’s** sustainable growth of value is the innovation potential in our Business Units and the Corporate Research Center.

**Supported by a** balanced system of decentralized and centralized R&T and R&D resources, **coordinated by the EADS R&T Network**.

**Based on a** high degree of cooperation and integration with public and private research organizations and institutions.

**Proven by numerous** first-time technology breakthroughs and international awards **given to EADS researchers**.
EADS Group Research & Technology
Two Main Pillars and Innovation Drivers

Corporate Research Centre
Main Sites: Suresnes & Ottobrunn
Sharing expertise, facilities, skills, experience, best practices

Corporate Research Center

Core Competencies

Materials & Processes and Advanced Manufacturing

Structures Engineering and Acoustics

Microsystems, Electronics and Image Processing

Systems Engineering and Systems Environment Science

Processes for Engineering and Information Management Techniques

Standardization, Patents, Intellectual Property Strategy and Knowledge Management

- Composite Technology
- Friction Stir Welding
- Smart Structures
- Adv. Structural Modeling
- Advanced Concepts
- EMC Simulation
- Microsystems
- Micro Aerial Vehicle Demonstrator
- Virtual Product Engineering
EADS Top Technology Nominations

„Virtual Product Engineering“
Simulation / Modelling
Configuration engineering
Concurrent engineering
PDM and KBE

„Advanced Materials, Structures Engineering and Manufacturing“
Advanced Manufacturing and Processes
CFRP / New alloys
Smart Structures

„Robust Intelligent Systems“
Integrated Modular Avionics
Guidance, Navigation and Control
Image processing
Onboard systems engineering

„Friendly Airframe / High Performance Vehicles“
Aerodynamics and acoustics
Stealth and signature control
Environment, Propulsion

„Integrated Smart Product“
Microwave technologies / Radar
Optics / Optronics
Microelectronics /-systems

Physics of Flight, Propulsion, Energy and Acoustics
Information and Software Technologies, Advanced Processes
Materials, Structures and Advanced Manufacturing
Electronics, Microelectronics, Optronics and Microwaves

Systems and Related Services

ICAS 2004
Yokohama, Sept. 1, 2004

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Innovation in Technology: Airbus Examples

1988  A320
Innovation in Technology: Airbus Examples

2006 A380
Increasing Demand for Integrated Systems and Solutions in the Military Market

Netcentric Warfare

Navigation/Communication Systems

Information
Available to the right people

Speed
Real-time connectivity to ensure flexible planning & navigation technologies

Precision
Affordable through new sensor & navigation technologies

Defence markets are changing their focus from platforms to integrated netcentric warfare capabilities - requiring innovative features
Innovation in Europe

- Innovation : cornerstone of the EU ‘Lisbon Strategy’
- Objective : R&D effort up to 3% of EU’s GDP by 2010
- Increased budget for EC Framework Programme (FP7)
- A coherent framework to foster competitiveness and contribute to Europe’s economy growth
- Action plan for innovation between EU Commission and Members States
European Initiatives: Political/Organisational Set-up Serving Innovation

- Air Transport System
  - ACARE / SRA * main recommendations in Vision 2020
- Space
  - Galileo / GMES
- Defence
  - European Defence Agency
- Security
  - Action plan on security research

* ACARE: Advisory Council for Aeronautical Research in Europe - SRA: Strategic Research Agenda
Research – Innovation - Market

Research and Technology (R&T)
- Breakthrough Research
- Development of Critical Technologies
- Technology Validation

Universities
Research Organisations
Industrial R&T

Development (D)
- Demonstrators
- Prototypes
- Product Definition
- Product Design and Development
- Product Qualification

Production

-10 -5 0 +5 years
Innovation & Partnership Policy

EADS Corporate Research Centre
« A Global Research Partner »

Partnering with leading-edge universities, public/private laboratories enables superior return on innovation investment
Conclusion

- Innovation is key
- Involvement of governments is essential
- Cooperation with scientific community is vital
THANK YOU