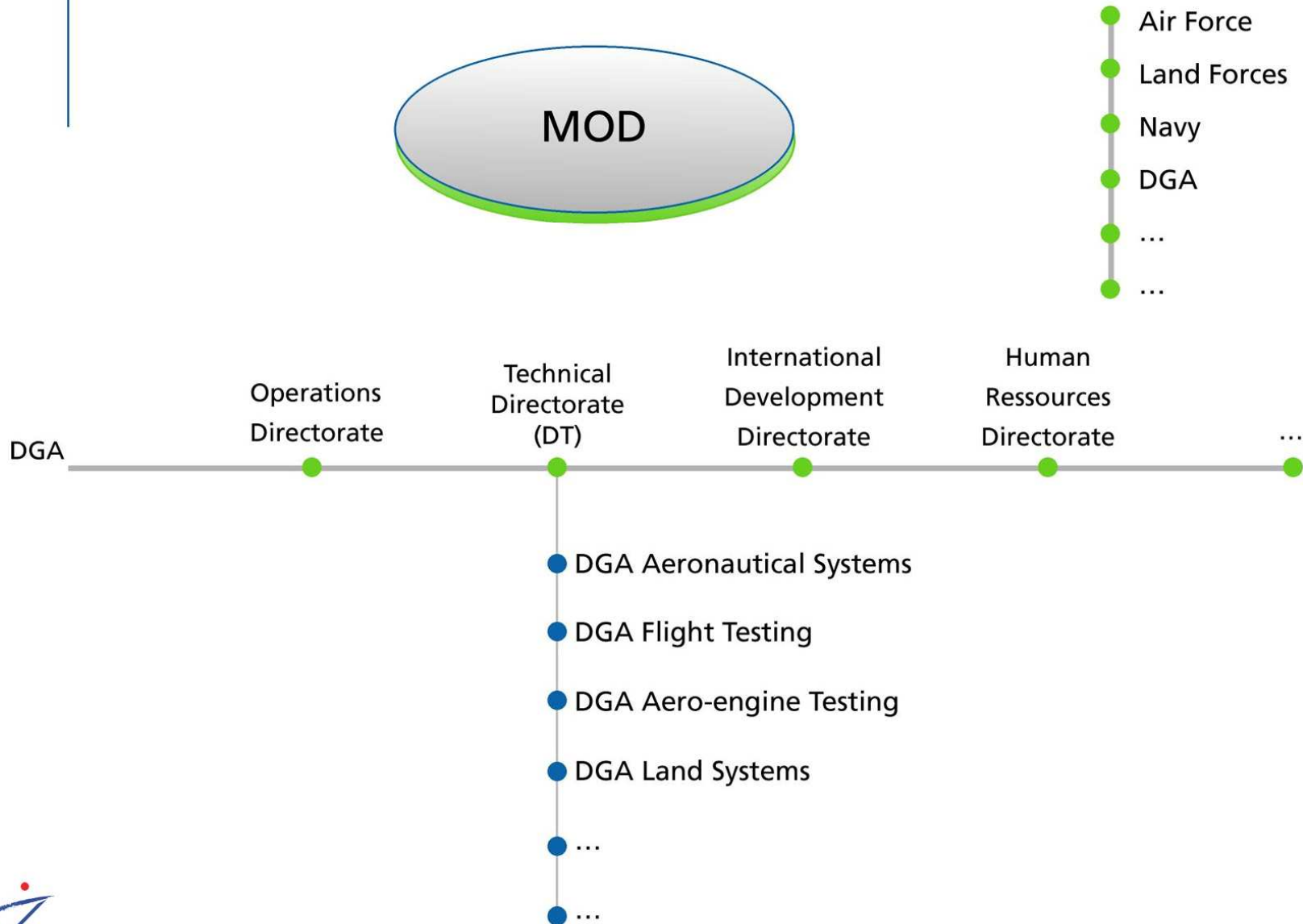


French MOD organisation chart





MINISTÈRE DE LA DÉFENSE
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DGA Aeronautical Systems, Ground Test Centre of the Technical Directorate of the DGA

OUR MISSIONS :

- **Provide expertise and carry out tests on behalf of DGA program executive officers**
- **Provide technical assistance to national and european technical authorities involved in airworthiness**
- **Technical authority in terms of airworthiness for governmental aircraft** in these areas: HIRF, HERO, HERP, Air-mobility, Structures, Embedded Systems
- **Bring test services to companies, French and Foreign**



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Key Figures 2011

63 million Euros
Turnover

75% MoD

5% National Authorities

20% Companies

550 Contracts

2 Locations

2 Dropping Zones

**Production
Manpower : 490**



DGA

DGA Aeronautical Systems



MINISTÈRE DE LA DÉFENSE
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CORE BUSINESS

FLIGHT SAFETY

AIRCRAFT AND EMBEDDED SYSTEMS

CREW and PAX SAFETY

CAPABILITIES

EXPERTISE

GROUND TEST





MINISTÈRE DE LA DÉFENSE
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KNOW HOW

STRUCTURES

MATERIALS & TECHNOLOGIES

SYSTEMS & SUBSYSTEMS

ENVIRONMENT & VULNERABILITY

EMBEDDED SYSTEMS & SOFTWARE

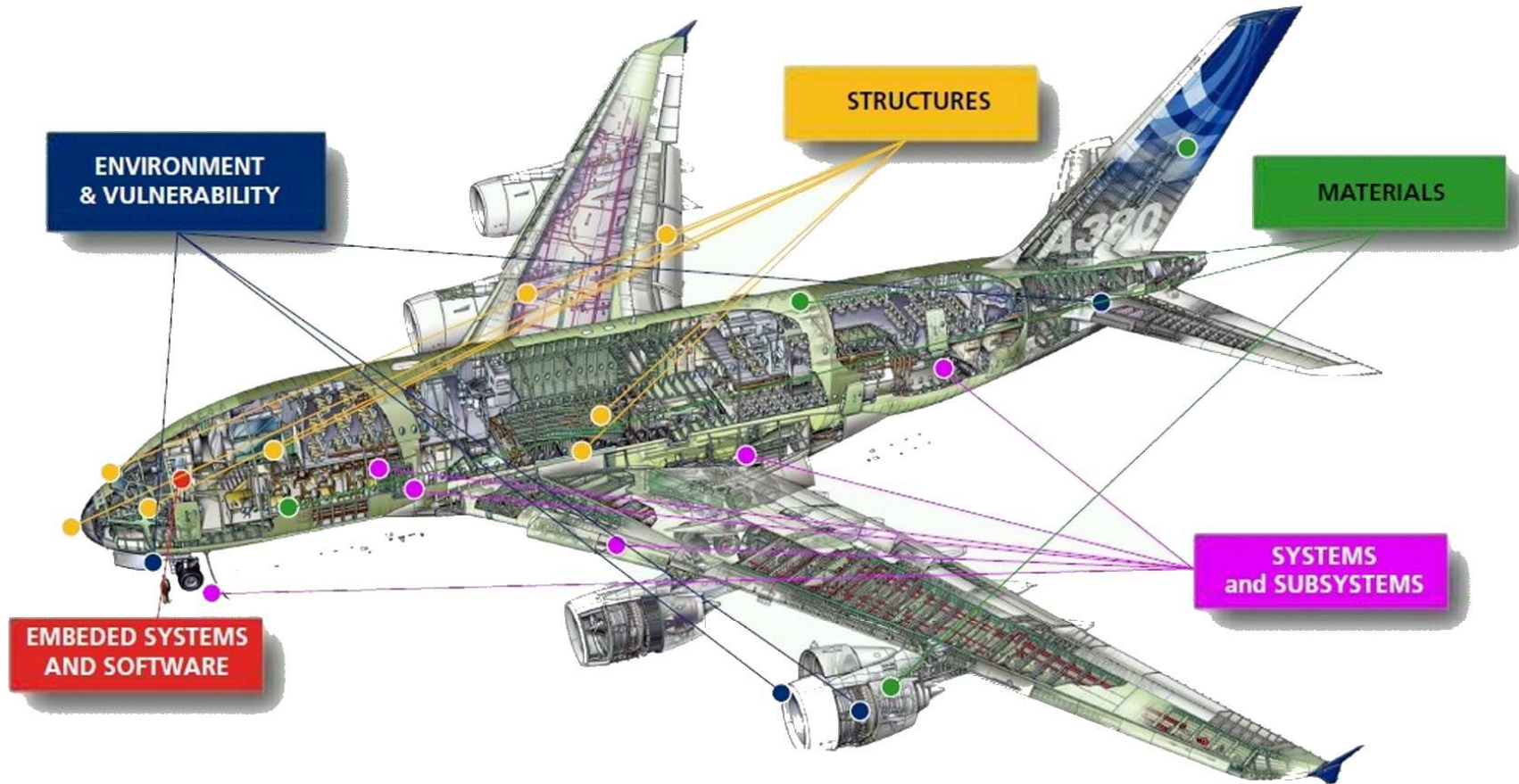
AIR MOBILITY

MISSION SUBSYSTEMS

TEST RIG ENGINEERING



Example of involvement



Covering product life cycle





MINISTÈRE DE LA DÉFENSE
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Innovation



**Operating
Performance**

CUSTOMER

STRATEGIC ORIENTATIONS

Customer

- Partnerships
- Technical seminars

Operating Performance

- Lean Management & Ingeneering
- Approvals ISO 9001, ISO 14001

Innovation

Investment





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DGA

Aeronautical Systems

Ways to make the Difference

- Public centre => Independance
- Test facilities system-dedicated unique in Europe
- Fully experienced in large test projects management
- Compliance of cost and time



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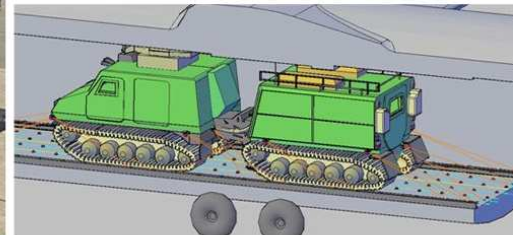
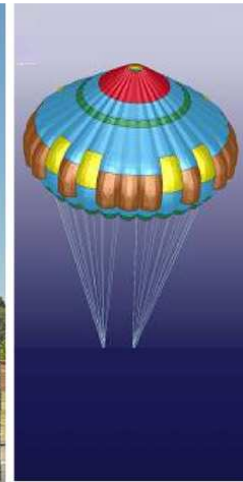
DIRECTION GÉNÉRALE DE L'ARMEMENT

DGA Techniques aéronautiques :
47, rue Saint-Jean - BP 93123 - 31131 BALMA CEDEX - FRANCE
dga.techniques-aeronautiques@dga.defense.gouv.fr
Contact : william.thomas@dga.defense.gouv.fr
Tél. : +33 (0)5 62 57 55 22





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AIR MOBILITY

- Air Transport, Helicopter Transportation
- Air Dropping
- Paratrooping
- Ropping, Winch Up



DGA Aeronautical Systems

Activities 2011

- 70% Expertise
- 30% Test

Customers

- 98% MoD
- 2% Companies





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LEVEL of SAFETY
AND PERFORMANCE
DEFINITION

TYPE
CERTIFICATION

SYSTEM
ENGINEERING

AVIONICS ARCHITECTURE
ANALYSIS

QUALIFICATION
TO AERONAUTICAL
ENVIRONMENT

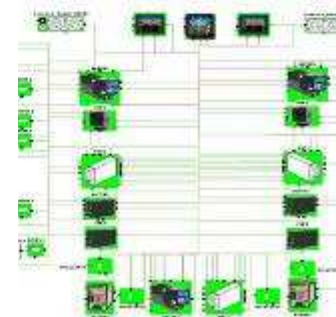
SOFTWARE EXPERTISE

EMBEDDED SYSTEMS & SOFTWARE

- Critical embedded software safety
- Avionics



DGA Aeronautical Systems



Activities 2011

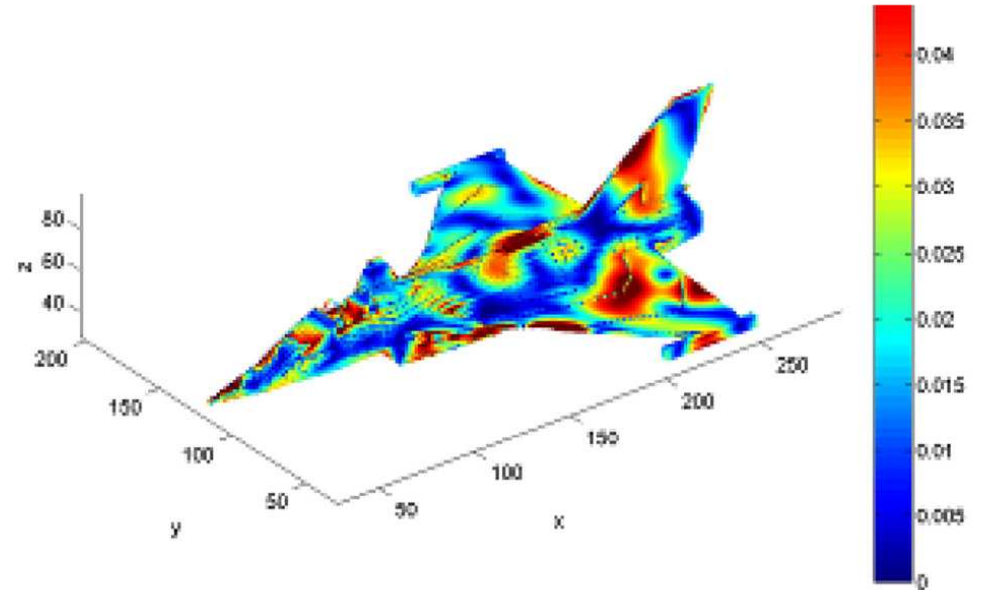
- 75% Expertise
- 25% tests

Customers

- MoD
- EASA (European Aviation Safety Agency)



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ENVIRONMENT & VULNERABILITY

Vulnerability of systems and equipments assessment to stresses encountered in service:

- High Intensity Radiated Fields
- Lightning and Electrostatic Discharges
- Electromagnetical Compatibility
- HERO et HERP
- Mechanical (vibrations, shocks) and climatic environment in aeronautical conditions



DGA Aeronautical Systems



Activities 2011

- 35% Expertise
- 65% Tests

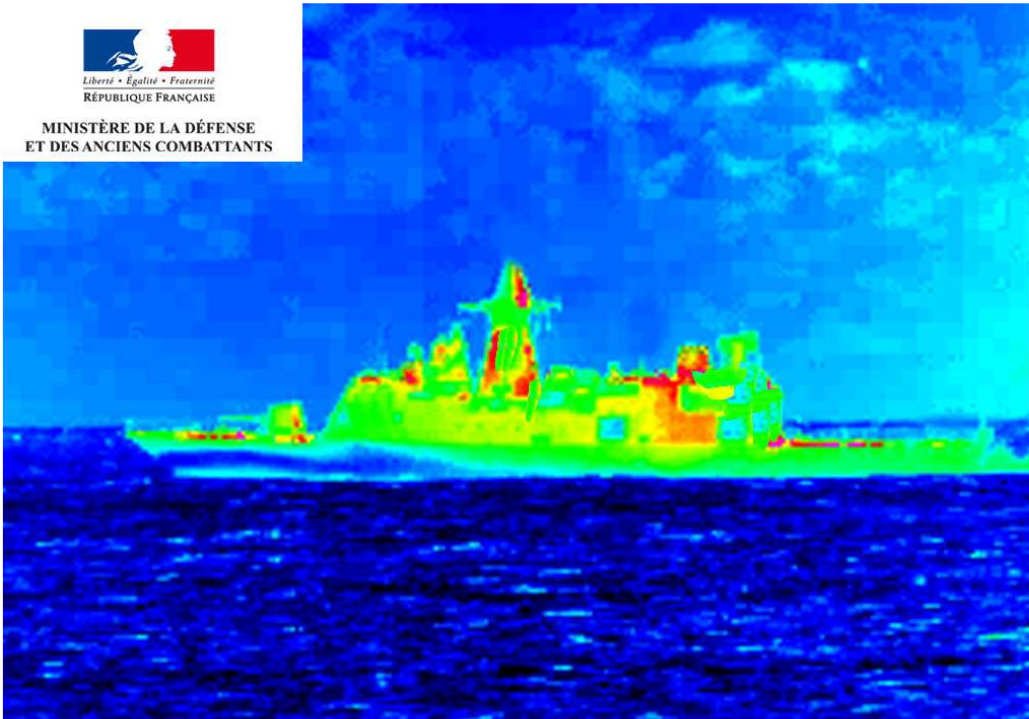
Customers

- 90% MoD
- 10% Companies



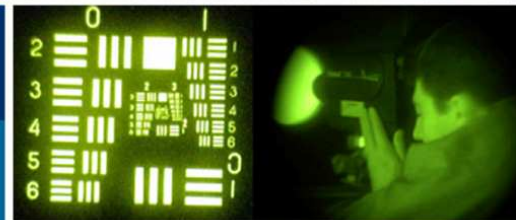


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MISSION SUBSYSTEMS

- Infrared Signature characterisation
- Night vision & Infra Red
- Crew rescue equipments
- Colorimetry, stealthiness and low observability



Activities 2011

- 40% Expertise
- 60% Tests

Customers

- 100% Military
 - > 90% MoD
 - > 10% Companies

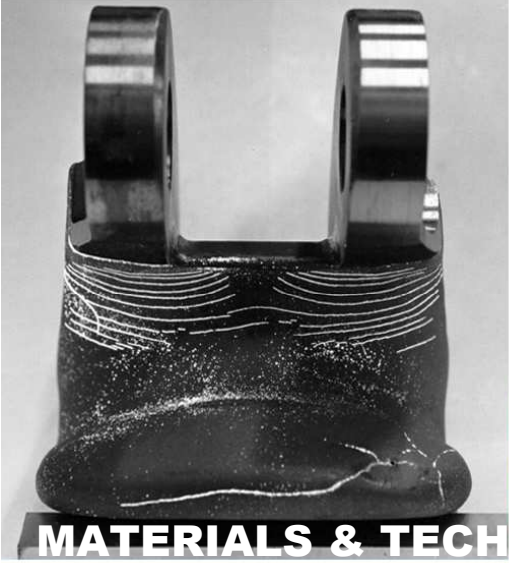




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MATERIALS & TECHNOLOGIES



Activities 2011

- Materials for airframe and engine applications
- Mechanical characterisation
- Corrosion and coating evaluation
- Fire behaviour
- Very high temperatures

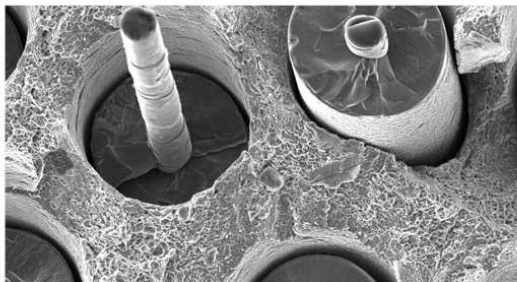


Investigations

- 80% Expertise
- 20% Tests

Customers

- 60% MoD
- 40% Companies

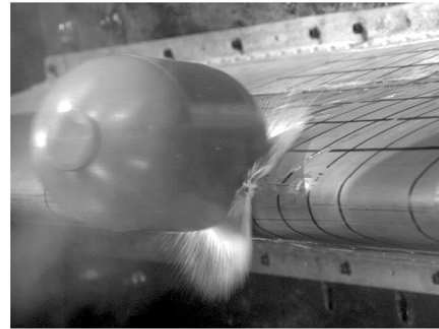
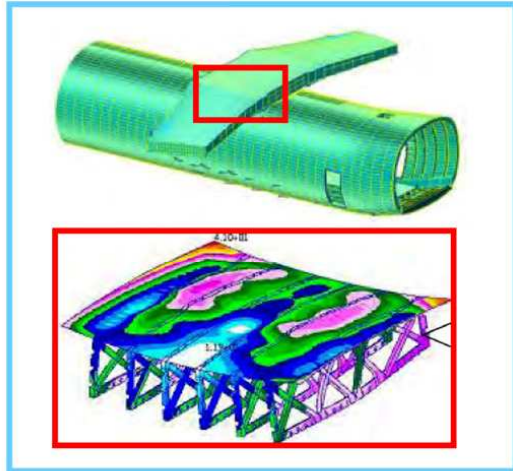
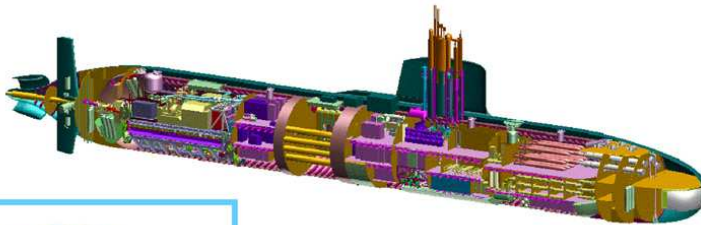


R&T





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STRUCTURES

- Static, fatigue and dynamic testing for structures and sub-assemblies (Development, Certification, Life Extension)
- Structural computation
- Compliance of structures with airworthiness regulations
- Fleet aging monitoring



DGA Aeronautical Systems

Activities 2011

- 75% Expertise
- 25% Tests

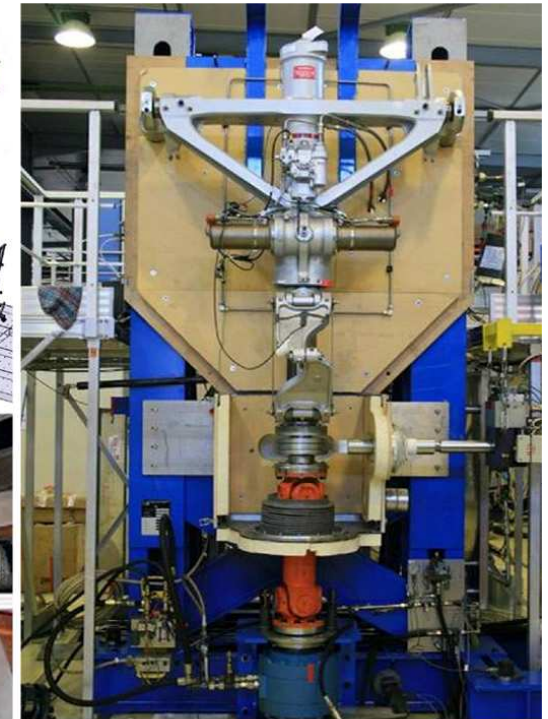
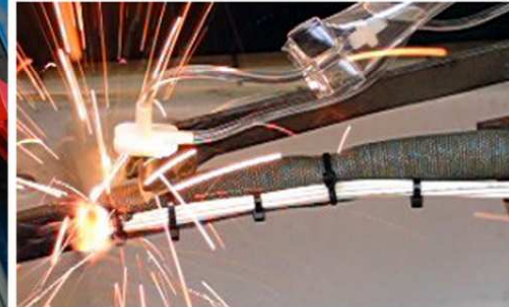
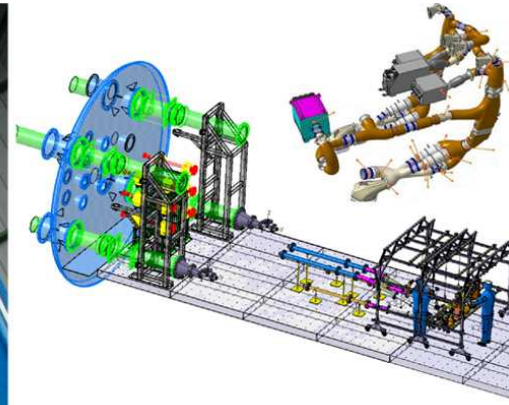
Customers

- 60% MoD
- 40% Companies





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SYSTEMS & SUBSYSTEMS

- Electrical power systems
- Electrohydraulic power systems
- Landing systems
- Tyres, wheels, brakes
- Thermal management
- Flight environmental conditions



DGA Aeronautical Systems

Activities 2011

- 20% Expertise
- 80% Tests

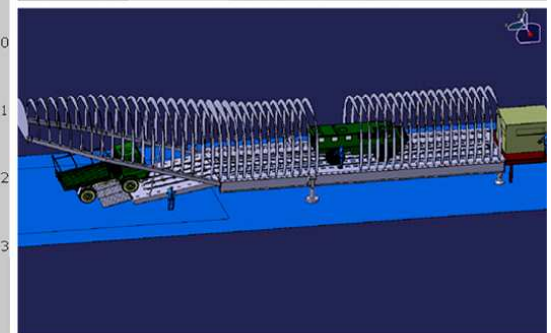
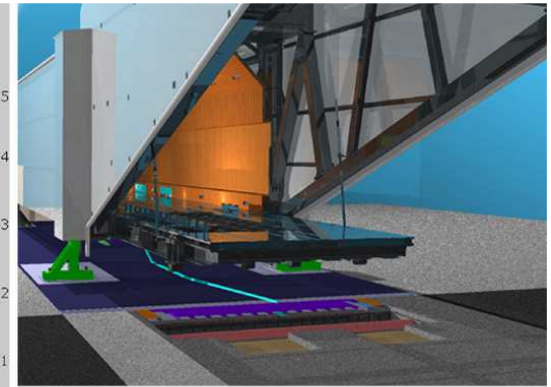
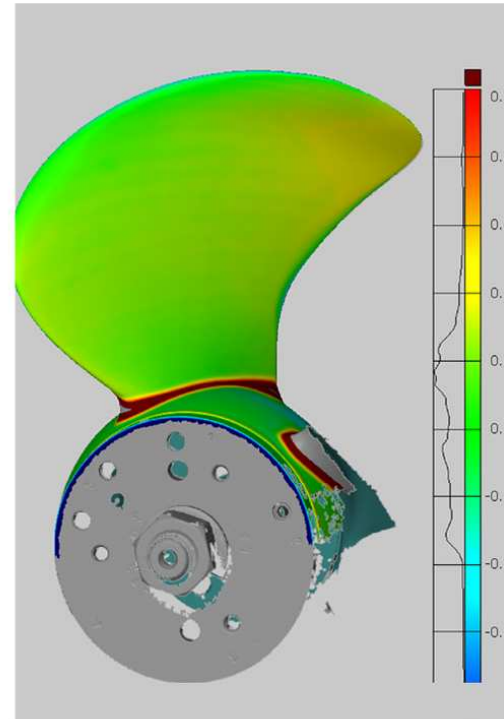
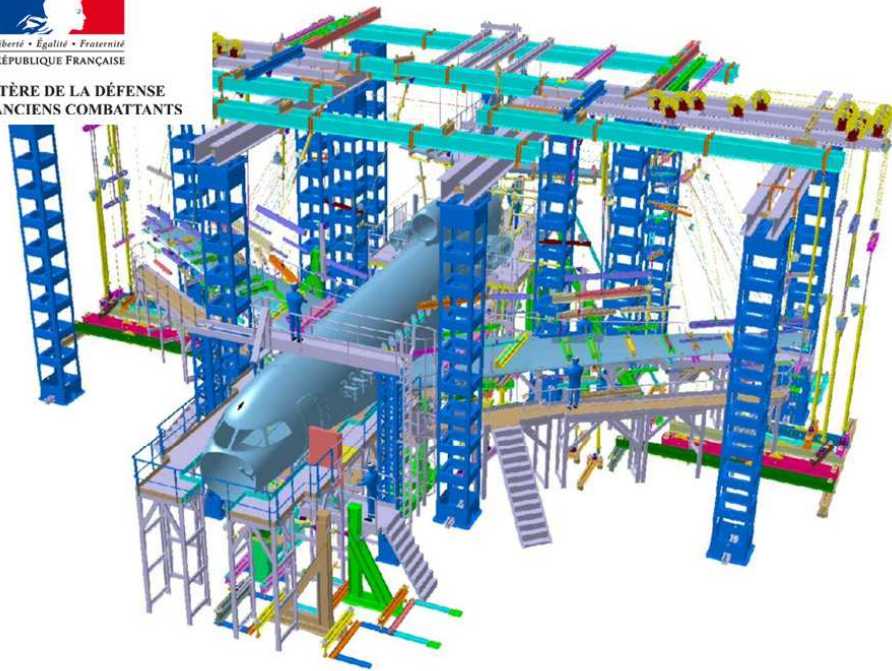
Customers

- 50% MoD
- 50% Companies



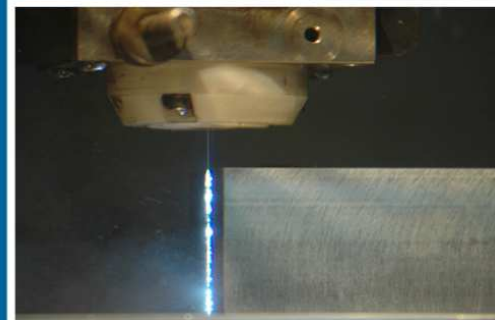


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TEST RIG ENGINEERING

- Test rig desing
- Instrumentation, data acquisition, high speed video (in flight and on ground tests)
- Metrology
- Scientific and technical data processing



Activities 2011

- 50%
 - > Structures
 - > Systems & Subsystems
- 30%
 - > Environment
 - > Vulnerability
 - > Crew rescue
- 20%
 - > Materials

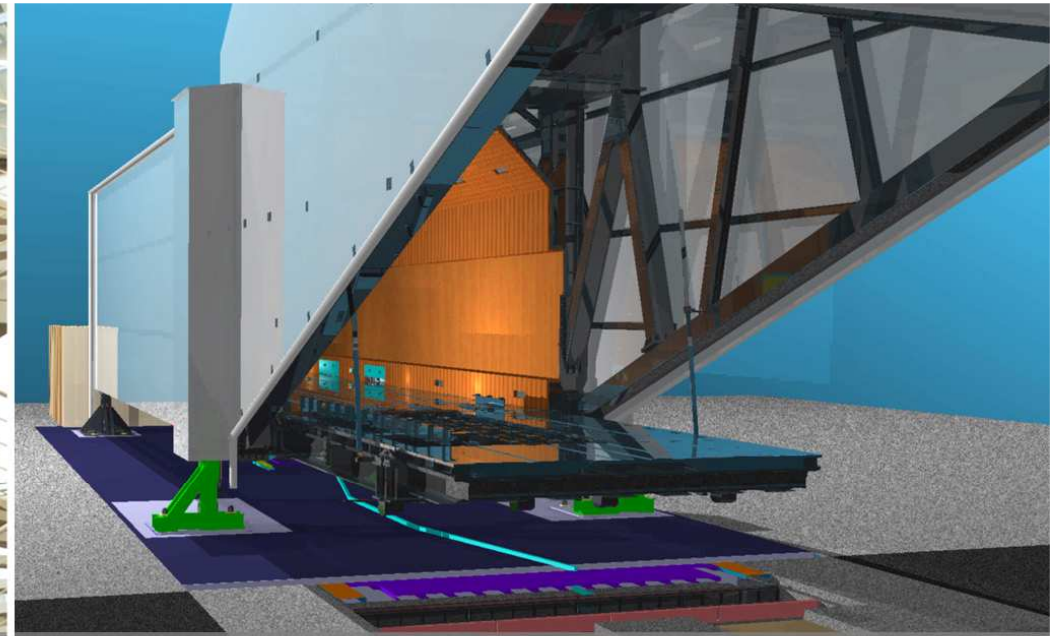




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MESSIR : large curved CFRP panels test



A400M hold mock up

MEGA : large landing systems dynamic test



EMMA : lightning test on composite materials



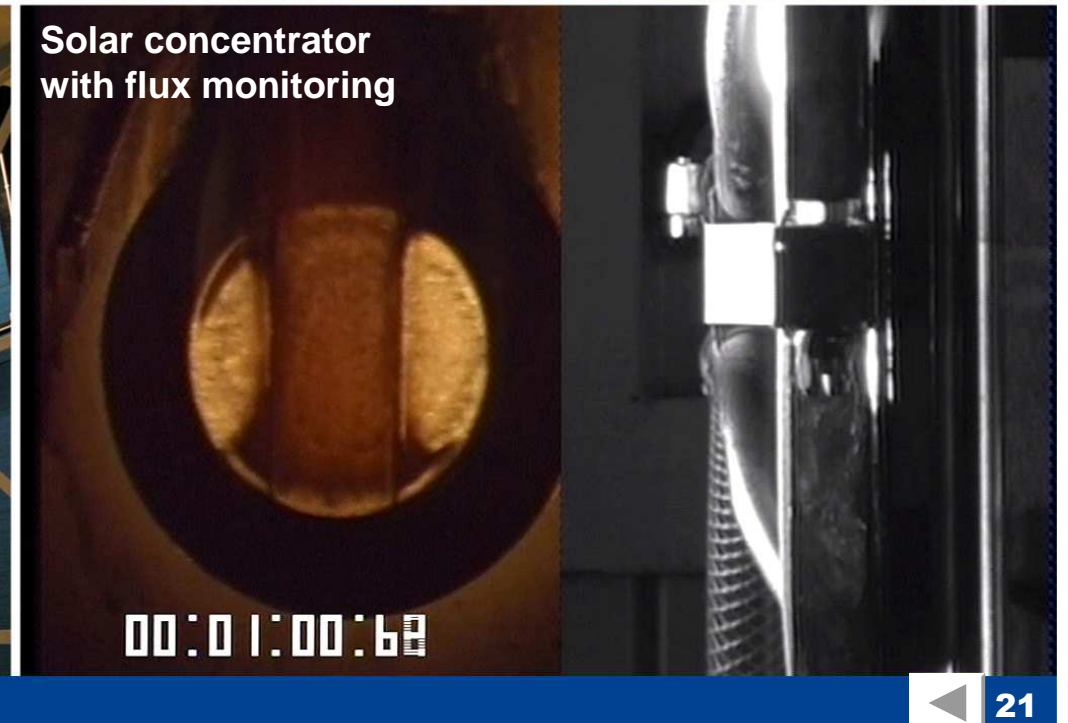
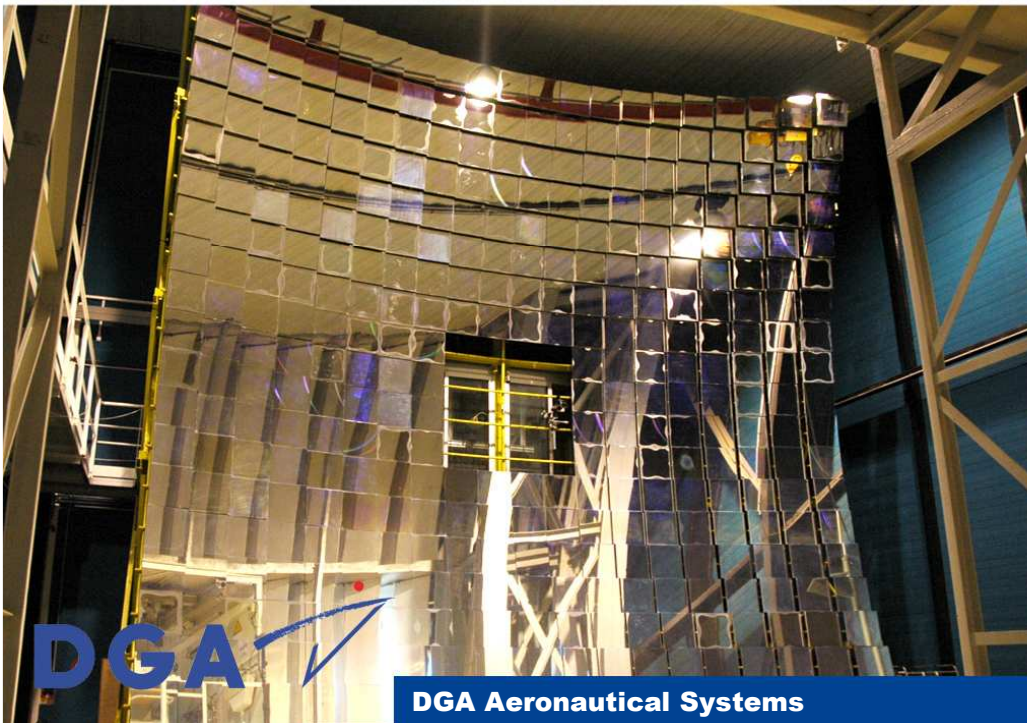


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Odeillo location



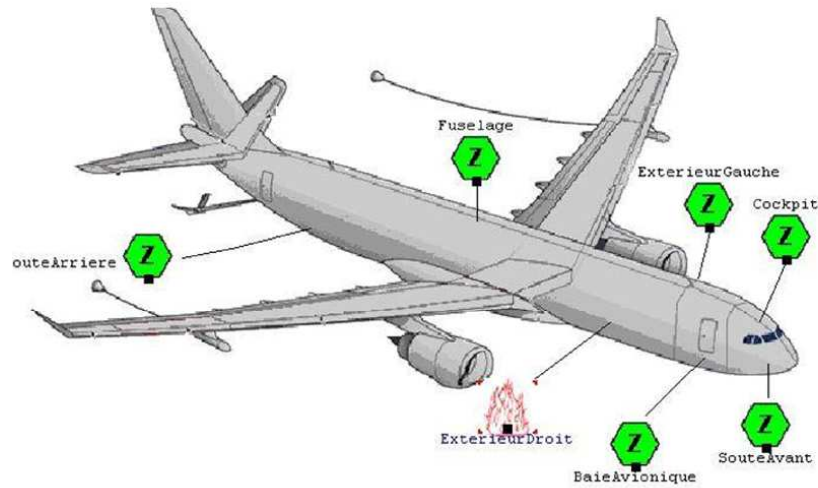
Solar concentrator
with flux monitoring



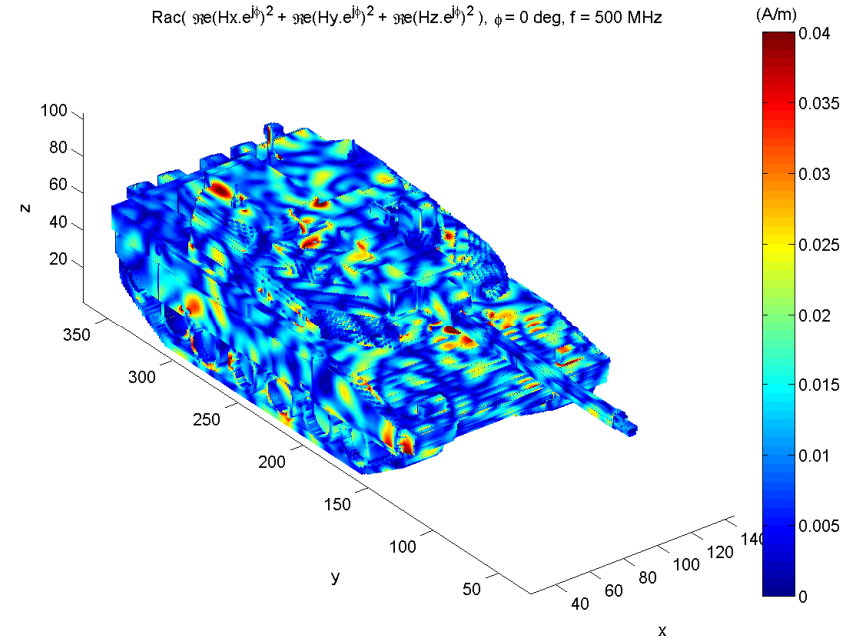
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$$\text{Rac}(\sqrt{\epsilon(H_x \cdot e^{i\theta})^2 + \epsilon(H_y \cdot e^{i\theta})^2 + \epsilon(H_z \cdot e^{i\theta})^2}), \phi = 0 \text{ deg}, f = 500 \text{ MHz}$$



Innovation

- Upgrade our assessment methods and means to take into account technological mutations
- Bring into force validated solutions in two years
- Be Involved in local research labs and companies



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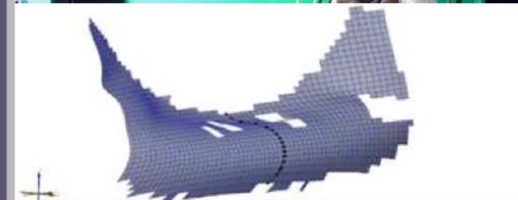
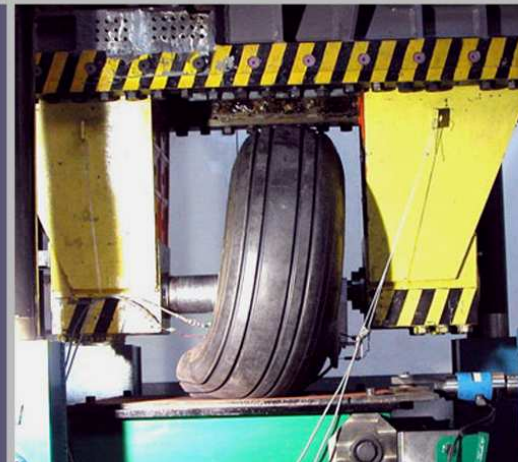
2011

**Innovation
In expertise**

- Computation
- Virtual Testing
- Gigacyclic Fatigue
- Non Destructive Testing

Innovation in test

- Electric brake test
- Arc tracking
- 3D Digital Image Correlation



Technical Seminars

Air Transport



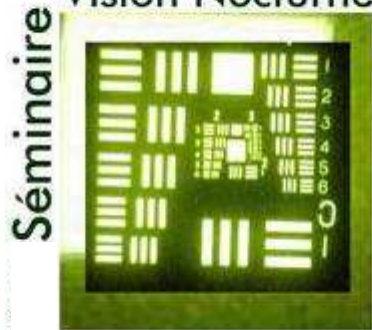
HERP



Air Dropping



Vision Nocturne



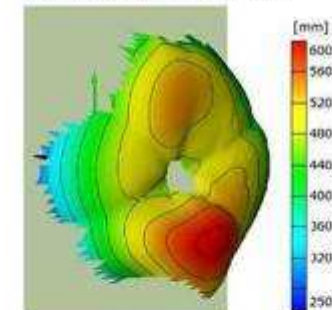
Night Vision

Journées Thématiques CND



NDT

Journées thématiques
Numérisation 3D et
stéréocorrélation



3D digital
image correlation



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PUBLIC



INDUSTRY

