



Aerospace Cluster in Rhône-Alpes

Rhône-Alpes, a different perspective on aeronautics





Rhône-Alpes Aerospace Industry

➤ Rhône-Alpes competitors

- o More than 250 specialists (From tier 1 to tier 2 suppliers of parts, sub-assemblies or complete units)
- o R&D capacities
- o Conception and production as risk-sharing partner
- o Employees: 16 000, Turnover: € 1,5 bn
- o More than 100 EN/AS/JISQ 9100 certified bodies
- o NADCAP accredited bodies (HT, NDT, WLD, ETG)

➤ Strong research capacities

- o 4th European region for research and technology
- o More than 40 laboratories and 5 technical centres linked to prime contractors

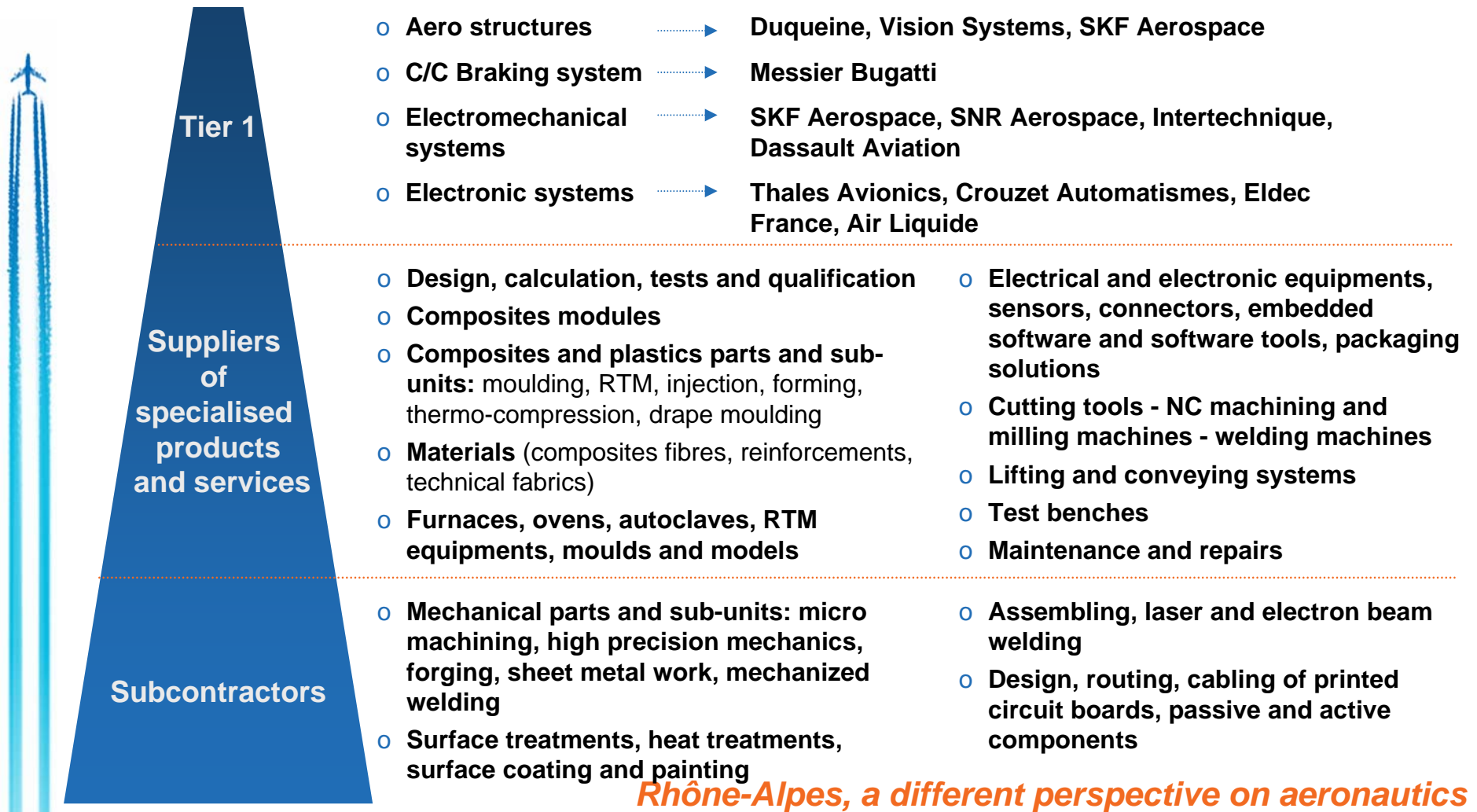
➤ Professional training

➤ Infrastructures

- o Lyon St Exupery, the 2nd French regional platform (more than 6 M passengers)



Rhône-Alpes Aerospace Industry



Rhône-Alpes, a different perspective on aeronautics



- Adetel Group
- AIP – groupe Nief Plastic
- Eldec France – Crane Aerospace
- Messier Bugatti - groupe Safran
- Groupe AIRIA
- Reel
- SunAero
- Vision Systems Aeronautics
- Carbone Forgé

- Alcoa Fastening Systems
- GKN Aerospace
- HEF Groupe
- Intertechnique - Groupe Zodiac
- André Laurant
- Praxair Surface Technologies
- FMDL - Forgital Group
- Sorome
- Thales Angénieux

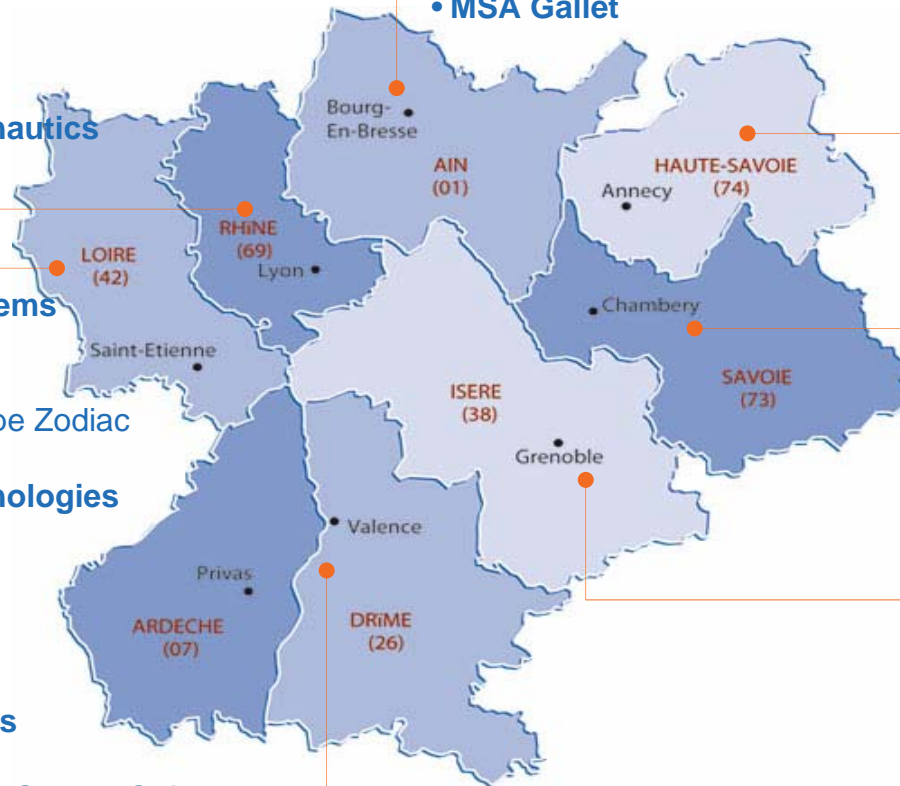
- Crouzet Automatismes
- Efitam
- Sagem Electronique – Groupe Safran
- SKF Aerospace
- Survey Copter
- Thales Avionics
- Vignal Artru Industries

- Cogemoule
- Duqueine Composites
- Hexcel Composites
- MSA Gallet

- Alcatel Adixen
- Amphenol Socapex
- Dassault Aviation
- Label SA – groupe Cobham
- Nicomatic
- Sensorex – Meggit group
- SNR Roulements
- Techmeta - groupe Bodycote

- Onera
- Timet Savoie
- Lisa Airplanes

- Air Liquide - DTA
- Dufieux Industries
- Dolphin Integration
- Hexcel reinforcement
- Le Creneau industriel
- Memscap
- Porcher Industries
- Radiall
- Thales Avionics LCD





Rhône-Alpes products and services

Interiors products

- Cockpit door module
- IFE
- Connectors
- Floor covering
- Roller blinds
- Sunvisors
- Roller shades
- Seats fabrics

Composites airframe & window frames

Flight control rods

Carbon / Carbon braking system

Advanced composites materials

Engine cowlings

Gas generating systems (Obiggs/Obogs)

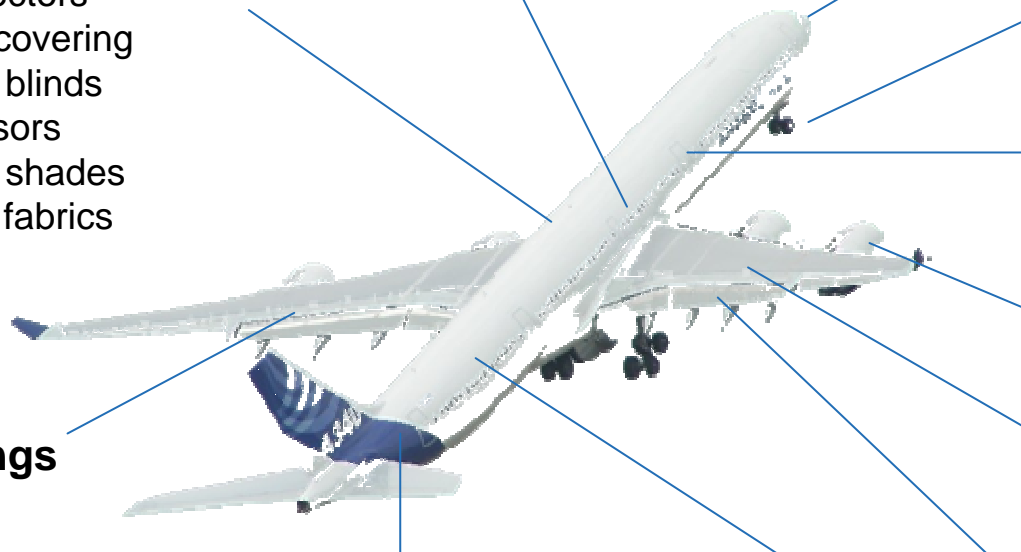
Fuel system

Pressure Bulkhead

Bearings

Embedded electronic equipments

- Computers
- Power supply
- Sensors - Connectors
- Monitoring systems
- Tests and qualification
- PCB, backplanes



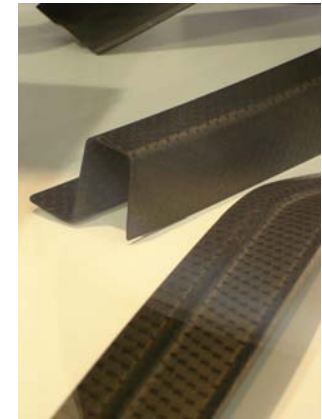
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Rhône-Alpes products and services

AEROSTRUCTURES

- Composites fuselage frames
 - Composites window frames
 - Composites and metallic rods
 - Composite Door Systems
 - Helicopter frame structure
 - Engine fan duct for test structures
 - Cockpit Door Module
 - Advanced composites materials
 - Reinforcements (including 3D textile pre-forms)
- ⇒ Calculation
 - ⇒ Design
 - ⇒ Process engineering
 - ⇒ Industrialisation
 - ⇒ Manufacturing
 - ⇒ Assemblies

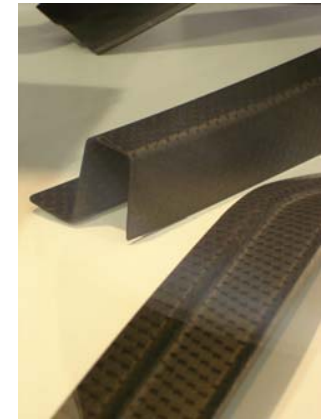




Rhône-Alpes products and services

COMPOSITES AND PLASTICS

- **Materials** : composites fibers, reinforcements and textiles preforms
- **Composites process** : Moulding, RTM, Injection, infusion, forming, thermocompression, Drape forming
- **Plastics process** : Injection, Moulding, Thermo- compression, Thermoforming
- **Plastics and composites machining**
- **Tools**
 - Overbraiding machines, Composites moulds
 - Autoclaves, ovens and heating equipments
 - RTM injection units
 - Software : simulation
- **Engineering services**
- **Materials characterisation and NDT services**
- **RDT projects**
- **Training**



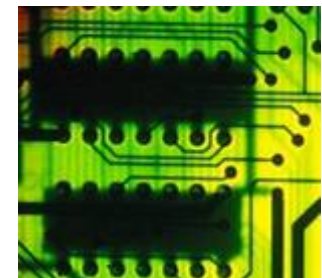
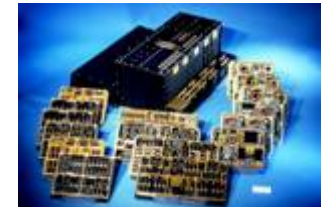


Rhône-Alpes products and services

EMBEDDED ELECTRONICS

- Navigation systems, Gas generating systems
- Computers
- Power supply
- Sensors, Connectors, switches
- Monitoring, detecting systems
- Chips / electronic components
- Tests and qualification
- PCB, backplanes
- Design, routing, cabling of electronics cards

- ⇒ Design
- ⇒ Industrialisation
- ⇒ Manufacturing
- ⇒ Assemblies
- ⇒ Engineering
- ⇒ Electronics
- ⇒ Micro-electronics
- ⇒ Mecatronics / Mems



SOFTWARE SOLUTIONS

- Embedded software validation / detection of run-time errors, reverse engineering, embedded software, debug Solutions, virtual system analysis

- ⇒ EN 9100
- ⇒ Nadcap

Rhône-Alpes, a different perspective on aeronautics





Rhône-Alpes products and services

INTERIORS

- Cockpit door module
- IFE systems & cabin management systems
- Connectors
- Floor covering
- Roller blinds
- Sunvisors
- Roller shades
- Seats fabrics and leather
- Seat and cabin furnitures
- Seat shelf
- Skin foam
- Passenger covers





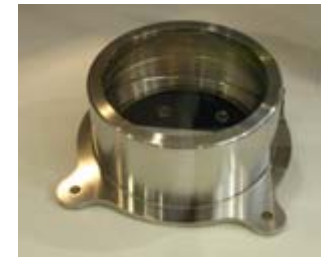
Rhône-Alpes products and services

MECHANICS

- Fuel system
- Bearings
- Flight control rods
- Parts, sub-units, units for engines, landing gear, hydraulic servo control, hydraulic pumps, fuel control, air conditioning, gear boxes.....
 - Hydraulic blocks
 - Flight command
 - Precision gearings
 - Ductings
 - Screw fastenings
 - Spring washers
 - Bolts and fasteners
 - Tubular systems
- Forged parts (open die forging or ring rolling)
- Precision parts, sub-units, units by micromachining (0.5 up to 250 mm)
- Surface treatments and heat treatments

- ⇒ Design
- ⇒ Manufacturing
- ⇒ Assemblies

- ⇒ EN 9100
- ⇒ Nadcap



Rhône-Alpes, a different perspective on aeronautics



Rhône-Alpes products and services

ENGINEERING SERVICES

- o **Mechanical design and engineering**
- o **Electronics design and engineering**
- o **CFD solutions**



PROCESS EQUIPMENTS AND SERVICES

- o **Complete workshops realization** (Robotics and vision control)
- o **Final assembly line jigs and tools**
- o **Maintenance hall jigs and tools**
- o **MMS Process machines for fuselage panels** (Green Advanced Panel)
- o **Cooling system**
- o **Special machines** (Composites machining, large parts...)
- o **Welding systems**
- o **Composites** (Autoclaves and ovens - Special tooling - RTM systems)
- o **Equipments tests and qualification** (environmental, vibratory, mechanical tests, HALT, CEM)
- o **Tests benches**
- o **SPC software solutions**

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The 4th European region for RDT



Structures and materials

- o Metals and composites
- o New materials, alloys, polymers, coating, tribology
- o Fatigue, ageing, damage
- o Process engineering
- o Conception, vibration, lightning, structure integrity, shock

Systems

- o Mechanic, electronic and numeric systems
- o Electric, power electronics, automatic and embedded systems engineering
- o Sensors and optics
- o Human-machine interface

Aerodynamics and propulsion

- o Acoustics and Vibration
- o Aerodynamics
- o Propulsion
- o Test benches
- o Noise

- ✓ 40 international-scale laboratories
- ✓ Innovation and performance for aeronautical systems
- ✓ European research program partners
- ✓ Specific equipments :
 - o Test benches,
 - o Computer centers,
 - o Special machines,
 - o Instrumentation
 - o ...





The Rhône-Alpes Aerospace Cluster initiative

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Aerospace Cluster

www.aerospace-cluster.fr

Key data

- €1,5 bn of annual sales
- 16 000 employees
- 500 companies

History

- ➔ 1995 First Rhône-Alpes pavillon at Paris Air Show
- ➔ 2000 First Aerospace dedicated work plan in Rhône-Alpes
- ➔ 2005 Aerospace Cluster launch
- ➔ 2009 Cluster management improvement
- ➔ 2010 Creation of Aerospace Cluster Association (Non profit organisation)

Charter members

- ➔ SKF Aerospace, Thales Avionics, Intertechnique, Messier Bugatti, Adetel group, Environne'tech, Vision Systems, Amphenol Socapex ...
- ➔ Ecole Centrale de Lyon, Insa de Lyon, EMSE, INPG
- ➔ Région Rhône-Alpes, CRCI, ARDI

Structure and management

- ➔ Network (non profit organisation to be set-up)
- ➔ Steering Committee and Scientific Committee
- ➔ Supported by an Executive team (2.2 FTP)

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Strategy

Ambition 2014

To install Rhone-Alpes as recognized aerospace region
supplier of innovative technological solutions
for aeronautics and space.

Main objectives

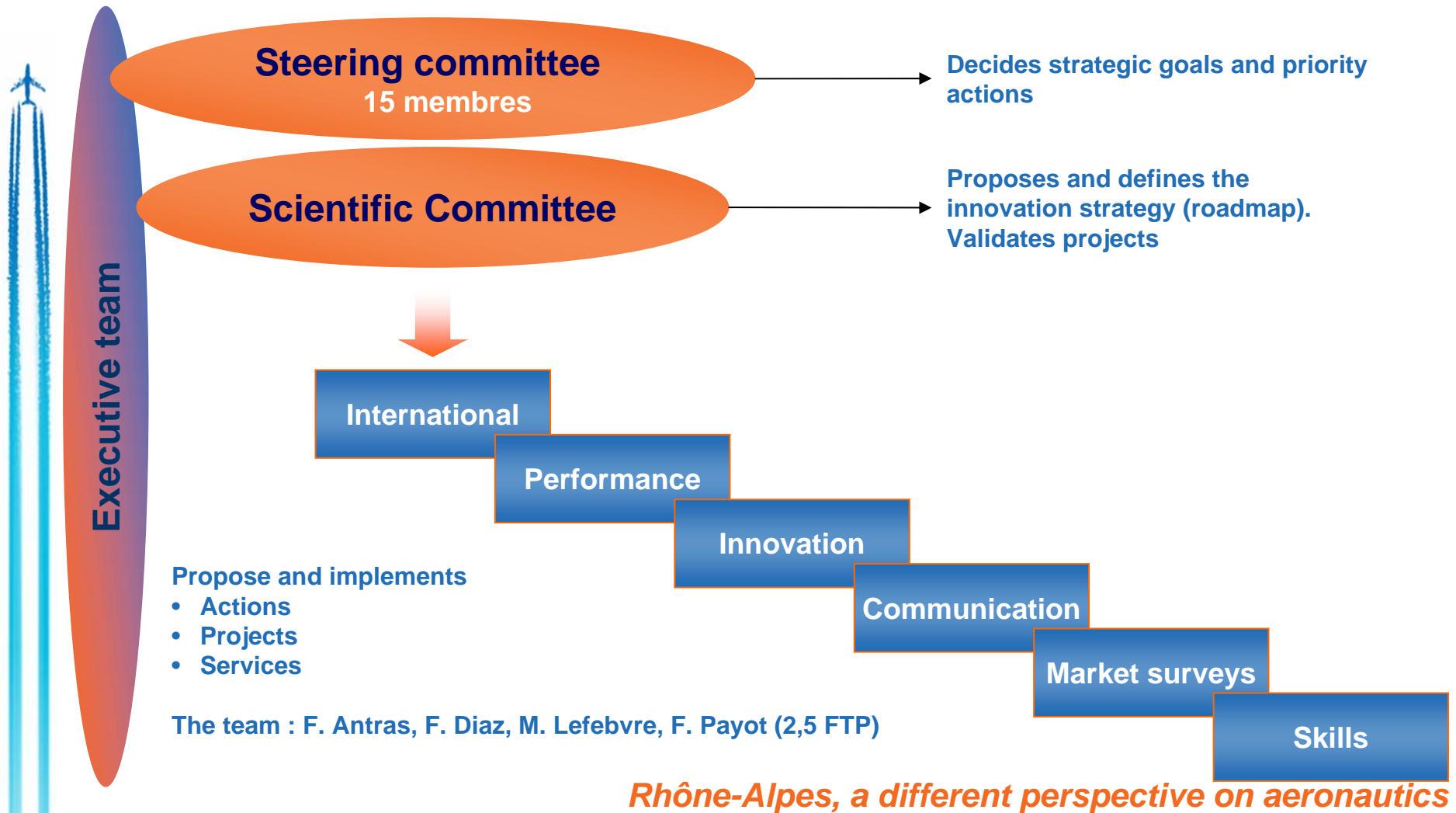
- ➔ To federate local players and create synergies
- ➔ To identify and manage structuring projects
- ➔ To support members innovative projects
- ➔ To strengthen the regional supply-chain
- ➔ To improve member's international market share
- ➔ To develop fruitful partnerships

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Organisation





Member services



International

⇒ Trade fairs and missions, Business convention, work groups and exchanges between members

Performance

⇒ Coaching programs to work on Strategy, Progress plans,(cost reduction, quality ...), supply-chain ...

Innovation

⇒ From project engineering to lobbying, to secure project financing

Communication

⇒ Newsletter, Website, events, press

Market survey

⇒ Monthly survey, Annual survey, documents



Member services

Innovation

Strategic Activity Domains (DAS)

- ➔ **Materials and process**
 - o Composites & Technical Textiles
 - o Mechanical engineering
 - o Tribology

- ➔ **Electronics**
 - o Embedded
 - o Hard&Soft engineering
 - o Power electronics
 - o Sensors
 - o Microelectronics

- ➔ **Calcul – Simulation** (Noise, Vibration, Aerodynamics, CFD ...)

- ➔ **New segments** (UAV, business jets ...)



Member services

Innovation

Some projects

- ➔ **ATENA**
New technology to manufacture carbon/carbon reinforced fabrics
- ➔ **TEXTILUB**
New generation of aeronautical bearings
- ➔ **LCM-SMART**
Composite Liquid Moulding
- ➔ **SCADRI**
Sensitivity of advanced digital circuits vis-à-vis ionizing radiations
- ➔ **CRISTAL**
New process to manufacture complex composites parts



Contact

Frédéric ANTRAS

Aerospace Cluster in Rhône-Alpes

Phone : +33 4 72 11 43 31

e-mail : contact@aerospace-cluster.fr

Website : www.aerospace-cluster.fr



Members

- o **Primes** : SKF Aerospace, Messier Bugatti, Intertechnique, Air Liquide, Crouzet Automatismes, Amphenol Socapex, Timet...
- o **PME** : Adeneo, Ades technologies, Adetests, Aeroform France, AIP, Andre laurent, Corima Modelage, Daxen, Dufieux Industries, Duqueine Composites, Environne'tech, Fiateq, Fluorem, Fsp One, Laser rhone-alpes, Le Creneau Industriel, Lisap, Metracem, Minitubes, Modelage Mécanique du Dauphine, Modertech industries, Nicomatic, Pezet decolletage, Sensorex, S. Industries, Smoc Industries, Sorome, Groupe Thermi Lyon, Transformers, Uf1...

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