SAFIR

SURFACE ADVANCED FUNCTIONALIZATION FOR INDUSTRY AND RESEARCH

SAFRAN oerlikon

cnrs Université de Limoges IRCER

avrul AGENCE POUR LA VALORISATION DE LA RECHERCHE UNIVERSITAIRE DU LIMOUSIN

SAFIR

A unique platform in Europe

Created in 2019 by **an industrial (SAFRAN, OERLIKON) and academic (IRCER, its CNRS and University of Limoges supervisors) consortium**, SAFIR is a unique technology platform in Europe in the field of dry process surface treatments.

This technological platform meets the needs of the **aeronautical, nautical, automotive, electronics and energy industries**. It strengthens an established ecosystem (skills and equipment) for over 30 years in Limoges (IRCER, Carmalim, Oerlikon Balzers, Citra, Ensil-Ensci).

OUR **ACTIVITIES**

COLLABORATIVE RESEARCH

Backed by the PROTHEIS joint laboratory (Safran, Oerlikon, Ircer), the SAFIR platform is also open to other industrial sectors in the transport sector (nautical, automotive, railway) and more generally to any sector using dry deposition processes.

INDUSTRIAL MATURATION

SAFIR enables the entire process of increasing maturity to be mastered, from fundamental research to functional prototypes in real-life conditions (TRL 1 to TRL 6).

INDUSTRIAL SERVICES

SAFIR is open to companies wishing to carry out studies and will be able to benefit from a cutting-edge technological tool, unique in Europe, and the internationally recognised expertise of the IRCER laboratory.

SCIENTIFIC RESOURCING

SAFIR's ambition is to promote scientific and technological exchanges in the field of surface treatments with the top technology research national and international laboratories and to attract talent from around the world.

TRAINING

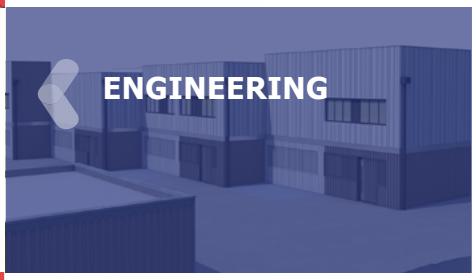
Oriented towards training, the platform is associated with the ENSIL/ENSCI engineering school and the Faculty of Science and Technology of the University of Limoges.

OUR **EXPERTISE**

SAFIR is based on the unique combination of IRCER's expertise in technical ceramics, surface treatment and laser processes, Oerlikon's expertise in surface technologies and Safran's expertise in the design of critical products and systems.

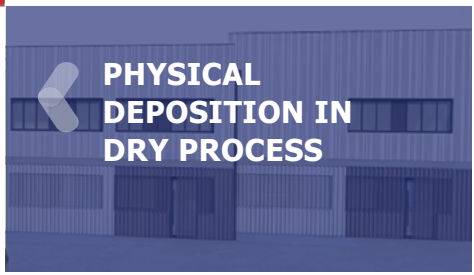
SAFIR integrates characterization benches and full access to the characterization equipment of the CARMALIM platform and the IRCER laboratory.

The SAFIR platform combines fundamental research and engineering to meet societal challenges, especially in the field of aeronautics.



SAFIR relies on a strong expertise and research conducted for several decades in materials science and forming processes.

The platform integrates an industrial PVD enclosure, a plasma projection cabin equipped with torches. Some of this equipment is unique in Europe.



OUR **EQUIPMENTS**

The platform brings together state-of-the-art equipment and high-level multidisciplinary skills in a constant improvement process.

Thermal spray and PVD tools

PVD COATING DEVICE INNOVENTA KILA

Arc and magnétron
HIPIMS (coming soon)

ROBOTIC SANDBLASTER

Vacuum machine
Manual option

THERMAL PROJECTION ATMOSPHERIC

Plasma
Low Pressure Cold Spray
HVOF(coming soon)

Dedicated characterization tools

GRINDOSONIC® MK7

Measurement of elastic properties

Demonstration of of endomagination

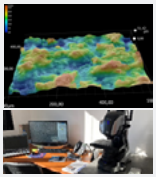
Detection of defects in a series of parts from room temperature to 1200 °C

BRUKER UMT TRIBOMETER MULTIPURPOSE

Measurement of tribological properties from room temperature to 1000 °C

Linear modulus from 0.1 to 100 N

3D KEYENCE MICROSCOPE

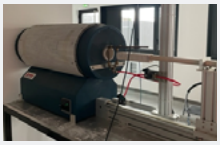


Magnification up to 2500x

3D roughness profile

Variable illumination mode for 3D visualisation

ELECTRIC CYCLING FURNACE THERMAL



Temperature rise up to 1400 °C

Compressed air cooling

Camera and pyrometer for monitoring delamination and temperature evolution

OUR **TEAM**

Alain DENOIRJEAN
SAFIR Platform Manager
CNRS Research Director at IRCER

Francis MONERIE-MOULIN
SAFIR Deputy Platform Manager
Thermal Spray Expert SAFRAN

Simon BONEBEAU
Thermal Spray Process Engineer

Nicolas LE SAUSSE
Characterization, Processes and
Materials technician

Sandrine LUCAS
Thermal Spray Deposition and associated
Characterization Engineer

Emile NADAUD
PVD Process, Characterisation and Mechanical
Properties Engineer

Quentin DUBREUIL
Tooling and Robotics Assistant Engineer

Chrystelle DOSSOU-YOVO
Valorization Coordinator

Elise GUYOT
Communication Coordinator

THE **CONSORTIUM**

SAFRAN

Safran is an international high-technology group operating in the aerospace (propulsion, equipment and interiors), space and defense markets. Our mission is to make a lasting contribution to a safer world, where air travel is increasingly environmentally friendly, comfortable and accessible. With operations on every continent, the Group has 84,000 employees and holds, alone or in partnership, world or European leadership positions in its markets.

OERLIKON

Oerlikon (SIX: OERL) designs materials, equipment and functional surfaces while providing its customers with expert services to improve and extend the life of their products. A leading global technology and engineering group, Oerlikon operates in two segments - Surface Treatments and Synthetic Fibers - and has more than 11,000 employees at 182 sites in 37 countries.

IRCER (CNRS/UNIVERSITY OF LIMOGES)

The Institute of Research on Ceramics (IRCER) (Mixed Research Unit 7315 under the supervision of the University of Limoges and the CNRS) aims to strengthen the international leadership of the ceramics sector and to increase its performance by exploiting the synergy and transversality between all the regional players in research on ceramics and associated processes.

OUR **PARTNERS**

PÔLE EUROPÉEN DE LA CÉRAMIQUE

CITRA
Centre d'Ingénierie en Traitements et Revêtements de surface Avancés

CTTC
Centre de transfert de technologies céramiques

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WITH THE SUPPORT OF

Région Nouvelle-Aquitaine

Limoges Métropole Communauté urbaine