



SAFIR

SURFACE ADVANCED FUNCTIONALIZATION
FOR INDUSTRY AND RESEARCH



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**.

SAFIR was created to meet the maturation needs, **up to TRL (Technology Readiness Level) 6**, of the **aeronautical industry** in order to allow a rapid transfer of innovations to its founding partners and their subcontractors. The platform is open to other companies in the aeronautics sector (excluding direct competition with the founding partners) and to all sectors requiring surface functionalities (**naval, automotive, electronics, energy, etc...**). SAFIR also offers a scientific resourcing activity in connection with the joint laboratory PROTHEIS.

Based on a **surface of 1200 m²** in the ESTER Technopole area in Limoges in the New Aquitaine Region, SAFIR strengthens the technological and scientific offer of the IRCER laboratory close to the transfer centers (CITRA, CTTC), the European Ceramics Cluster (PEC) and the ENSIL-ENSCI engineering school, specialists in the field of process and ceramics, relying on state-of-the-art tools and internationally recognized skills.

NOS OFFERS

TRL

6



3



1

SERVICES

SAFIR is accessible, upon request, to any company/organization wishing to realize specific function coatings by dry process (excluding direct competition with the founding partners) on a TRL level from 3 to 6: feasibility study, proof of concept (POC), characterization, etc.

COLLABORATIVE RESEARCH

This offer, on a TRL level from 1 to 3, is designed to develop collaborative projects based on calls for projects (regional, national, European, international) or private contract (CIFRE thesis) to optimize, improve and adapt innovative surface functions.

TRAINING

The platform offers professional training courses dedicated to dry process surface treatments and coatings, in particular ceramic-based coatings and their applications for engineers and technicians from small and medium-sized companies and large industrial groups. It also offers initial training and SAFIR is associated with the engineering school ENSIL-ENSCI 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.

CHARACTERIZATION

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.

ENGINEERING

MATERIALS

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.

PHYSICAL DEPOSITION IN DRY PROCESS

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

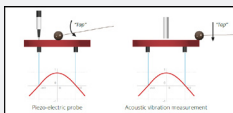


THERMAL PROJECTION ATMOSPHERIC

Plasma
Low Pressure Cold Spray
HVOF(coming soon)

Dedicated characterization tools

GRINDOSONIC® MK7



Measurement of elastic properties

Demonstration of endomagination

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

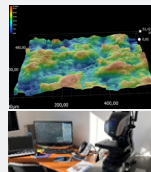
BRUKER UMT TRIBOMETER MULTIPURPOSE



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



Emile NADAUD

PVD Process, Characterisation and Mechanical
Properties Engineer



Quentin DUBREUIL

Tooling and Robotics Assistant Engineer



Magali FLOUZAT

Laboratory Assistant Engineer



Chrystelle DOSSOU-YOVO

Valorization Coordinator



Elise GUYOT

Communication Coordinator

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





Contact : safir@unilim.fr

www.safir-platform.fr



irCer



Université
de Limoges

AVEC LE SOUTIEN DE



RÉGION
**Nouvelle-
Aquitaine**



**Limoges
Métropole**
Communauté urbaine