

AERO BOOSTERS



# TECHNOLOGY PARTNER

## TO THE ENGINE MANUFACTURERS

Safran Aero Boosters designs, develops and produces low-pressure compressors, as well as equipment and test cells for aircraft and space engines. The company equips most current commercial aircrafts, as well as European launchers.



REVENUE (2018)

787 M€

SHAREHOLDING



67% Safran (F)  
 31% Walloon Region (B)  
 2% Federal Investment & Participation Company (B)

Designing the products we manufacture is our strength

REVENUE INVESTED IN R&D

15%

1 INTEGRATED SITE (BELGIUM) AND 2 SUBSIDIARIES (USA)  
 (DESIGN & MANUFACTURING)

1800 people

GREENER ENGINES

Products more compact, lighter, optimising the aerodynamics

NEW GENERATION INDUSTRIAL FACILITIES

Flexible Manufacturing System (FMS) lines

# LEADERSHIP POSITIONS

Low-pressure compressors from Safran Aero Boosters can be found on most commercial aircraft engines in all thrust ranges : from the largest engines for long-haul aircraft to the medium-sized and small engines used in regional and business aviation. The company has an outstanding reputation on the world market in lubrication and cooling equipment for aero-engines with 75% market share for medium-haul aircraft.

Safran Aero Boosters is also Europe's industrial reference for the design and manufacture of flow regulation valves for space engines and launcher stages. Along with its US subsidiary Safran Test Cells, Safran Aero Boosters has over 60 years of experience in the test cell industry for all types of aerospace propulsion (civil turbofan engines, military turbojets, turboshaft engines and APU's).



## BOOSTERS

LOW-PRESSURE COMPRESSORS & FRONT BEARING SUPPORTS



## OIL SYSTEMS

LUBRICATION UNITS, OIL TANKS, HEAT EXCHANGERS, SPECIAL VALVES



## TEST CELLS

TURNKEY TEST CELLS, TESTING EQUIPMENT, DATA ACQUISITION AND CONTROL SYSTEMS, SERVICES



## SPACE VALVES

FLOW REGULATION VALVES FOR ENGINES AND LAUNCHER STAGES



N° 1 medium and long-haul aircraft



N°1 medium-haul and regional aircraft



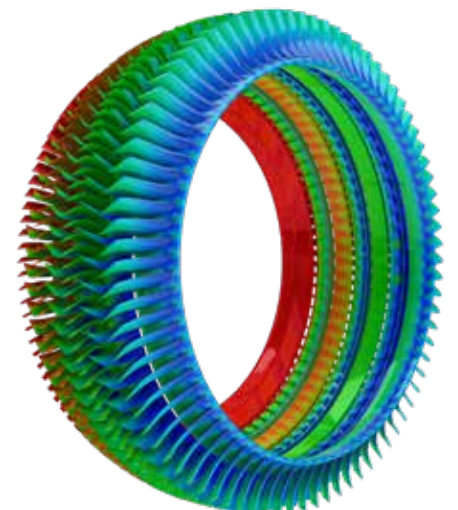
1 out of 3 large test cells worldwide



Valves leader on european launchers

Partner to the world's major aerospace key players, Safran Aero Boosters channels 15% of its revenue into preparing for the future. The company invests this money into fine-tuning its low-pressure compressors and equipment for four recent engines programs (GE Passport, Silvercrest, LEAP and GE9X), setting up modern and efficient industrial equipment and researching advanced technology for future engine architectures.

A Safran Company, Safran Aero Boosters owes its success to the caliber of its 1,800-strong team in Belgium as well as its two US subsidiaries: Safran Test Cells, a key player in test cells engineering and Safran Oil Systems, a specialist of oil tanks.





# BOOSTERS

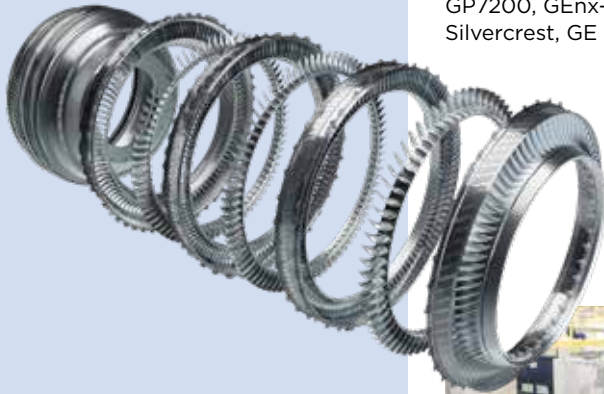
**DESIGN, DEVELOPMENT &  
MANUFACTURE OF TURBOJET  
LOW-PRESSURE COMPRESSOR**

Safran Aero Boosters is the world leader in the design, manufacture and assembly of low-pressure compressors and front bearing supports for turbofan engines. The company is also specialized in the manufacture and assembly of fan disks, thus confirming its status as an expert on the front sections of turbofan engines.



# 11

**LOW-PRESSURE  
COMPRESSORS  
DEVELOPED  
IN 15 YEARS**



**N°1 medium  
& long-haul aircraft**

Working in partnership with engine manufacturers, Safran Aero Boosters equips most commercial aviation engines across the entire thrust range. By contributing to the financing of new engines in association with engine manufacturers, the company takes full industrial responsibility for modules and/or equipment, which can represent up to 10% of the finished engine.

## **INVOLVED ON MOST COMMERCIAL ENGINE PROGRAMS**

CFM56-5A/5B/5C/7B, CF34-10 E/A, GE90,  
GP7200, GEnx-1B/2B, LEAP 1A/1B/1C,  
Silvercrest, GE Passport, GE9X.



## **ADVANCED TECHNOLOGY FOR FUTURE ENGINE ARCHITECTURES**

As a trusted technological partner, Safran Aero Boosters provides engine manufacturers with ground-breaking technologies in its fields of excellence, in order to rise up to the main challenges facing the aerospace industry. The ultimate goal is to create lighter, more compact low-pressure compressors with optimized aerodynamic performance (light-weight booster, high-speed booster,...).



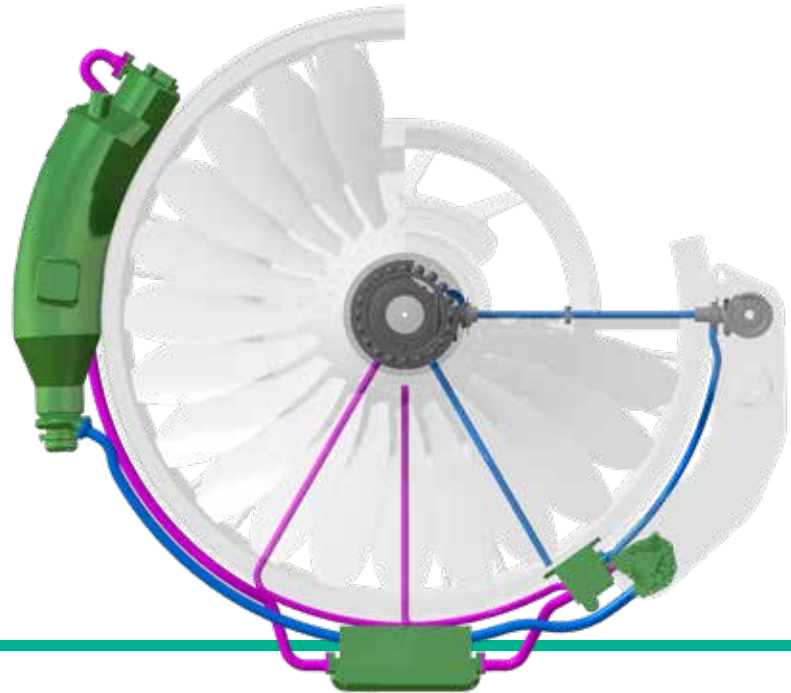
**MODERN & FLEXIBLE INDUSTRIAL FACILITIES**  
SPOOL LINE - Safran Aero Boosters workshop in Belgium



# OIL SYSTEMS

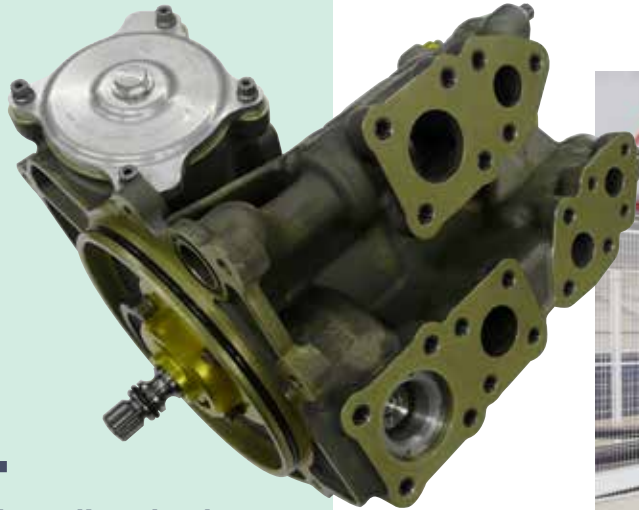
**DESIGN, DEVELOPMENT,  
MANUFACTURE & MAINTENANCE  
OF LUBRICATING AND COOLING  
EQUIPMENT**

With its wide range of equipment, Safran Aero Boosters has sound experience in lubricating and cooling commercial and military aircraft engines and, more recently, helicopter engines. As a partner on many engine programs with engine manufacturers, the company specializes in lubrication units, oil tanks, heat exchangers and special valves.





**EQUIPMENT  
THAT IS MORE  
COMPACT,  
LIGHTER &  
MORE ELECTRIC**



**N°1 medium-haul  
and regional aircraft**

As a Safran center of excellence for oil systems, Safran Aero Boosters offers total solutions from integration of products into the engine right through to design, manufacture, maintenance and in-service support. These solutions are characterized by extremely high performance and innovation levels due to continuous input from Research and Technology teams.

### **75% MARKET SHARE FOR SINGLE-AISLE COMMERCIAL AIRCRAFT**

CFM56-5A/5B/5C/7B, V2500, GE90, Kaveri, CF34-10 E/A, TP400 D6, SaM146, GP7200, Trent XWB, PW1000G, LEAP, Silvercrest, GE Passport, helicopter applications.



**MODERN & FLEXIBLE  
INDUSTRIAL FACILITIES**  
EDM TECHNOLOGY LINE (Electrical  
Discharge Machining) - Safran Aero  
Boosters workshop in Belgium

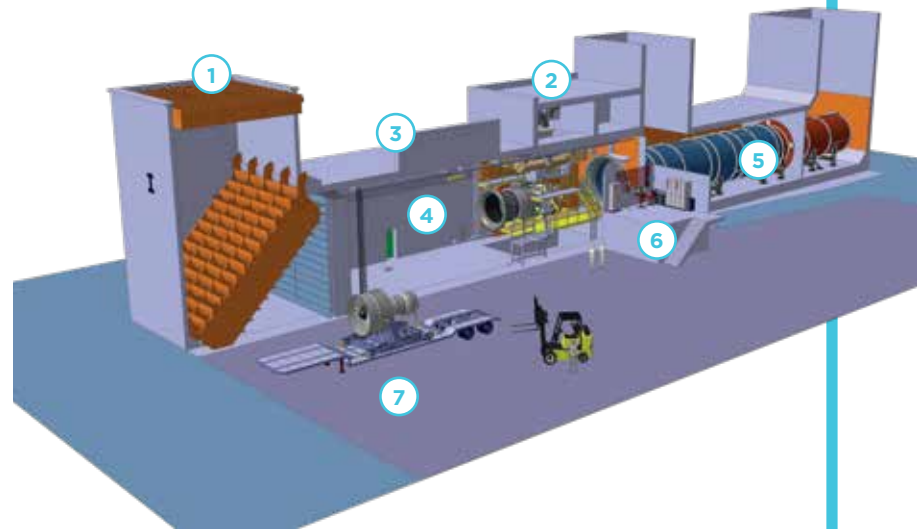
## AERO BOOSTERS



# TEST CELLS

**TURNKEY TEST CELLS OR  
UPGRADES, TEST EQUIPMENT,  
DATA ACQUISITION AND CONTROL  
SYSTEMS, SERVICES**

Safran Test Cells (formerly know as Cenco), a subsidiary of Safran Aero Boosters, has specialized for 60 years in Aero-Engine Test Facilities for the Commercial & Military Market (turbofans, turbojet, turboshaft & turboprop engines).



- ① Inlet // ② Fuel/Air/Oil/Electricity // ③ Thrust Stand // ④ Engine Adapter  
⑤ Exhaust // ⑥ Data Acquisition & Control System // ⑦ Engine Handling



# 1 out of 3

**LARGE TEST CELLS  
WORLDWIDE**

**Test to optimize  
the engine  
performance**



Safran Test Cells offers turnkey test facility projects as well as upgrade solutions which enhanced engine capacity. Its added value lies in A to Z project management, from design to manufacturing, installation and product service support.

Their clients include the most demanding aero-engine manufacturers (Safran Aircraft Engines, Pratt & Whitney, General Electric or Rolls-Royce), the largest MRO operators, together with Airlines and many Airforces. It has completed 200 projects across the entire range of test cells on the market.

## **TEST CELL SOLUTIONS FOR ALL TYPES OF AERO-ENGINES**

Including Trent 900/1000/XWB, GP7000, GE90, GEnx-1B/2B, CF34-8/-10, GE9X, GE Passport, CFM56, LEAP, Silvercrest, SaM146, TP400, F100, T56, M53, Adour, RB199, EJ200, Larzac, Atar, RTM322, Arriel, ...

## **FLAGSHIP PRODUCTS**



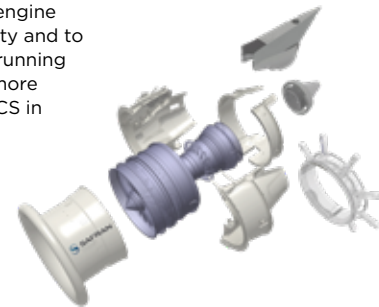
### **CYRES®**

Data acquisition and control system (DACS). Cyres includes the hardware and software installations needed to collect all the engine parameters, to operate the engine and the facility and to monitor the running of the test (more than 100 DACS in operation).



### **EOLINES®**

Specific test equipment used for engine ground testing in indoor and outdoor facilities are commercialized under the brand Eolines.







## AERO BOOSTERS

# SPACE VALVES

### DESIGN, DEVELOPMENT, ASSEMBLY & TESTING OF FLOW REGULATION VALVES FOR SPACE LAUNCHER ENGINES AND STAGES

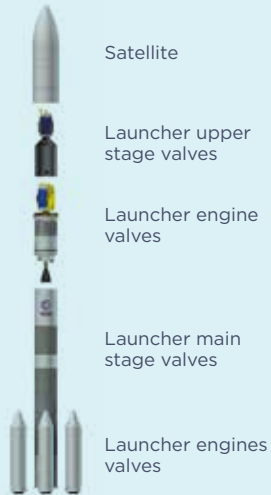
Safran Aero Boosters specializes in flow regulation valves for space propulsion. A partner of ArianeGroup on the Ariane 6 project, Safran Aero Boosters equips the engines of Ariane 6 (Vulcain 2.1® and Vinci®), as well as its Upper Stage, with 21 pieces of equipment for each launcher. With a strong focus on Research and Technology, Safran Aero Boosters is a partner on all future European propulsion programs.



# 100%

**PRODUCT  
RELIABILITY IN  
OUR 45-YEAR  
PARTNERSHIP  
WITH ARIANE**

## Valves leader on european launchers



**21 PIECES OF  
EQUIPMENT  
ON ARIANE 6**

Safran Aero Boosters's equipment is developed under extreme conditions of temperature, pressure, vibration and flow and has demonstrated 100% reliability over 45 years.

The company is able to harness this high-level expertise to provide flow regulation valves (pneumatic/electric - linear/rotative) for most of propulsion systems on launchers or satellites.

### **PROPULSION VALVES LEADER ON EUROPEAN LAUNCHERS**

Aestus, Vulcain, Vulcain 2, Vulcain 2.1, Vinci, A6 Stages, Satellites, ETID-1, Prométhée, M10 (VEGA-E)

### **CLEAN ROOM & 6 CRYOGENICS TEST BENCHES**

Making it possible to test our products up to -196°C and 400 bar

