SAFRAN OVERVIEW

Safran is an international high-technology group, operating in the aviation (propulsion, equipment and interiors), defense and space markets. Its core purpose is to contribute to a safer, more sustainable world, where air transport is more environmentally friendly, comfortable and accessible. Safran has a global presence, with 84,000 employees and holds, alone or in partnership, world or European leadership positions in its core markets. Safran undertakes research and development programs to maintain the environmental priorities of its R&T and innovation roadmap.

#1 WORLDWIDE
- Engines for single-aisle commercial jets (in partnership with GE)
- Helicopter turbine engines
- Landing gear
- Wheels and carbon brakes*
- Aircraft wiring systems
- Helicopter flight controls
- Cabin interiors for regional and business aircraft
- Water and waste management systems
- Evacuation slides and oxygen systems

SAFRAN IS AN INTERNATIONAL HIGH-TECHNOLOGY GROUP, OPERATING IN THE AVIATION (PROPULSION, EQUIPMENT AND INTERIORS), DEFENSE AND SPACE MARKETS. ITS CORE PURPOSE IS TO CONTRIBUTE TO A SAFER, MORE SUSTAINABLE WORLD, WHERE AIR TRANSPORT IS MORE ENVIRONMENTALLY FRIENDLY, COMFORTABLE AND ACCESSIBLE. SAFRAN HAS A GLOBAL PRESENCE, WITH 84,000 EMPLOYEES AND HOLDS, ALONE OR IN PARTNERSHIP, WORLD OR EUROPEAN LEADERSHIP POSITIONS IN ITS CORE MARKETS. SAFRAN UNDERTAKES RESEARCH AND DEVELOPMENT PROGRAMS TO MAINTAIN THE ENVIRONMENTAL PRIORITIES OF ITS R&T AND INNOVATION ROADMAP.

7% OF SALES INVESTED IN R&D

Safran applies a strategy based on innovation and continuous improvement in competitiveness, working closely with our suppliers and partners to address today’s economic, societal and environmental challenges.

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- Engines for single-aisle commercial jets (in partnership with GE)
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- Water and waste management systems
- Evacuation slides and oxygen systems

* Mainline commercial jets with more than 100 seats.

More than 84,000 employees worldwide

In 30 countries

Over €24.6 billion in sales generated in 2019

Safran Helicopter Systems
Safran Transmission Systems
Safran Electrical & Defense

ELECTRICAL POWER SYSTEMS
Safran Electrical & Power
Safran Power Units

Landing and Braking Systems
Safran Landing Systems

Avionics Systems
Safran Electronics & Defense

Aerosystems
Safran Aerosystems

Seats
Safran Seats

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WITH DECADES OF EXPERIENCE IN AVIATION, SAFRAN MASTERS THE TECHNOLOGIES THAT MAKE ROTORCRAFT OF ALL SIZES FLY, FROM HELICOPTERS TO TILT ROTORS, IN BOTH CIVIL AND MILITARY MARKETS.

INVENTING TOMORROW’S HELICOPTER

We know that the key to performance of modern helicopters is energy generation and efficiency. This is why Safran is playing an active role in the development of next-generation helicopters by investing in hybrid propulsion systems and electrical power systems. Through additive manufacturing and the use of materials such as carbon and composites, we are providing the market with lighter and greener equipment including, engines, engine cowls and brakes. Our strategy is to improve flight safety, reduce operating costs and decrease the environmental impact of helicopters.

SAFRAN’S COMMITMENT TO THE ROTORCRAFT MARKET

CUSTOMER SUPPORT GUARANTEED
Safran has a global service network that provides after-sales, customer and operators support, as well as maintenance, repair and overhaul services for its rotorcraft customers. We provide cost-effective maintenance packages that can be customized to meet the unique needs of our customers.

AN UNMATCHED OFFERING FOR ROTORCRAFT

Our products meet the needs of helicopter manufacturers across the spectrum, ranging from engines, auxiliary power units (APUs), power transmissions, electrical power management systems, to landing gear, wheels, brakes, navigation systems, flight monitoring solutions and flight controls.

INVENTORY SYSTEMS

- Inertial navigation systems
- Altitude & heading reference system

FLIGHT DATA MANAGEMENT

- Recording & transmitting units
- Analysis services

VISION

- Electro-Optical systems
- External lighting

FUEL SYSTEMS

- Flexible tanks
- Gauging systems
- Fuel circulation systems

CAVITY

- Passenger seats

SAFETY SYSTEMS

- Floats & rafts
- Life vests
- De-icing
- Pilot and passenger protection
- Cockpit voice & flight data recorder
- Ventilation systems

PROPULSION

- Engines from 500 to 3000shp
- Engine control unit

ELECTRICAL SYSTEMS

- Wiring
- Electrical distribution
- Electrical generation
- Power electronics & conversion

FLIGHT CONTROL SYSTEMS

- Electromechanical actuators

LANDING SYSTEMS

- Landing gear
- Wheels and brakes
- Electric braking systems
- Breaking and landing control units and actuators
SAFRAN, THE WORLD LEADER IN ROTORCRAFT TURBINES, IS THE ONLY MANUFACTURER DEDICATED EXCLUSIVELY TO THIS MARKET PARTNERING WITH MAJOR HELICOPTER MANUFACTURERS ACROSS THE GLOBE, ITS PRODUCTS EQUIP THE VERY LATEST DESIGNS, INCLUDING THE BRAND-NEW BELL 505 AND AIRBUS HELICOPTERS H160.

100% FOCUSED ON SAFETY AND CUSTOMER SATISFACTION

Safran’s priorities are to provide customers with safe, reliable and high-performance engines, to stay focused on their missions and to keep their helicopters flying every day, everywhere. With safety as our watchword, we are committed to meeting and surpassing the industry’s highest safety standards. Today, our best-selling Arriel is as reliable as the CFM56, the benchmark gold standard in commercial aviation.

COMMITTED TO PROVIDING CUSTOMERS WITH THE MOST COMPREHENSIVE AND RELIABLE SUPPORT, Safran Helicopter Engines operates 16 sites globally, including five dedicated to helicopter engine repair.

NEARLY 100 FIELD REPRESENTATIVES AND FIELD TECHNICIANS dedicated to our customers

MORE THAN 100 MILLION HOURS FLOWN by Safran Helicopter Engines are powered by Safran worldwide

TURBOSHAFT ENGINES

Our engine families, which include the Arrivel, Arrano, Arrius, Ardiden, Makila and Aneto have all been recognized for their safety, reliability and operational excellence. With solutions for single and twin engine helicopters, Safran can meet very specific needs of different helicopter missions.

#1 WORLDWIDE in helicopter turbine engines

A SAFRAN-POWERED HELICOPTER TAKES OFF EVERY 9 SECONDS somewhere in the world

MORE THAN 12,000 HELICOPTERS

TURBOSHAFT ENGINE CUSTOMERS:

• Airbus Helicopters
• Avicopter
• Bell
• Hindustan Aeronautics Ltd
• Korea Aerospace Industries
• Leonardo
• NH Industries
• Russian Helicopters
• Sikorsky

PISTON ENGINES: MINI SIZE, MAXI EFFICIENCY

For light helicopters or for long range unmanned aerial vehicle (UAV) operations, Safran is developing several aero-diesel engines operating on jet fuels. These offerings range from the certified SR305 series engine (230 to 265 shp) to the next-generation High Power Density Engine (400 to 800 shp). Their low fuel consumption increases the endurance by 20% to 100% compared with small turbine engines.

ADDRESSING THE HEAVY ROTORCRAFT MARKET

Designed for new super-medium and heavy helicopters, Aneto high power engine family features several models ranging from 2,500 to over 3,000 shp output. Leonardo has selected the Aneto-1K to power its AW109K twin-engine. Airbus Helicopters has chosen the Aneto-1X to power its Racer (Rapid and Cost-Efficient Rotorcraft) high-speed demonstrator. Aneto offers a new level of performance coupled with reduced operating costs. Aneto-1K has been certified by the EASA in December 2019 and is now ready for service.

POWER TRANSMISSION

Leveraging more than 40 years of experience in power transmission technologies, we provide helicopter manufacturers with new applications including engine reduction gearboxes, accessory gearboxes and transfer gearboxes to help boost performance and reliability.

ARRANO: The most innovative turboshaft in its class

Safran’s latest helicopter engine, the 1,100 to 1,500 shp Arrano, incorporates cutting-edge technology and numerous innovations. It offers a 15% improvement in fuel consumption over competing engines – one reason why Airbus Helicopters chose it to power the H160. It has received EASA certification on June 2019 and is now ready to support the H160 entry-into-service.

ARRIUS 2R: The only 500 shp helicopter engine to feature dual channel FADEC

The Arrius 2R (500 shp) was selected to power the new Bell 505, successor to the hugely popular Bell 206 Jet Ranger – of which 7,000 examples were sold. The partnership is on track to deliver unprecedented levels of reliability and low maintenance costs. The engine was certified in December 2015.
ELECTRICAL POWER SYSTEMS
INNOVATING FOR TOMORROW’S “MORE ELECTRIC” ROTORCRAFT

ALL ONBOARD ELECTRICAL FUNCTIONS
As the world leader in electrical wiring interconnection systems, Safran is a recognized supplier to helicopter manufacturers around the world. From design and development to production and support, we cover other onboard electrical functions including generation, distribution, conversion, load management, systems integration, filtration and ventilation.

ENHANCED RELIABILITY POWER SYSTEMS
Safran has engineered a range of auxiliary power units including the eAPU and Saphir Power System families, providing a wide range of solutions for new-generation rotorcraft. Capable of supporting either pneumatic or electric main engine start and delivering electrical power on ground, or in flight, their proven reliability allows operations in the most severe conditions.

HYBRID ROTORCRAFT PROPULSION
Safran is committed to meeting the needs of tomorrow’s more electric helicopters. By combining expertise in engines, electrical and power management systems and eAPUs, we are developing hybrid propulsion systems to remain at the cutting edge of helicopter innovation.

ELECTRIC BRAKES
Combining new-generation composite carbon friction material and electric actuators, our electric brakes represent a major improvement in helicopter braking. We were the first company to equip a helicopter with this new-generation braking system.

ENGINES™ ELECTRICAL MOTORS
Safran has designed a full range of engines™ electrical motors. They are smart, efficient, optimized and adapted to a wide range of applications from actuation to propulsion.

CUSTOMERS:
- Airbus Helicopters
- Avicopter
- Bell
- Boeing
- Hindustan Aeronautics Limited
- Leonardo
- NH Industries
- Sikorsky

ENGINEERS™ ELECTRICAL MOTORS
Safran has designed a full range of engines™ electrical motors. They are smart, efficient, optimized and adapted to a wide range of applications from actuation to propulsion.

#1 WORLDWIDE IN AIRCRAFT ELECTRICAL WIRING INTERCONNECTION SYSTEMS
#2 WORLDWIDE IN ELECTRICAL POWER & DATA GENERATION
#1 WORLDWIDE IN POWER TRANSMISSIONS (electric start on new jet with more than 100 seats)
A WORLD LEADER IN AVIATION FOR BUSINESS JETS, HELICOPTERS AND MILITARY AIRCRAFT
SIKORSKY GOLD SUPPLIER FOR ELECTRICAL WIRING INTERCONNECTION SYSTEMS

Main and Auxiliary AC/DC
Power Generation (Air & oil cooled)
Electrical Harnesses

BTP Cooling

Cabin & Avionics Fan

Full 3D structure layout

Power Electronics, GCU & Conversion

Primary & Secondary Distribution Systems & Components

Engineering, Services Integration, Certification, On-site Installation

Full 3D structure layout
Combining advanced engineering, integrated systems technology and in-depth service experience, we offer cost-efficient solutions to helicopter and tiltrotor manufacturers around the world.

Our capabilities include landing gear, landing gear extension and retraction systems, steering systems, braking systems, as well as wheels and brakes integration.

**BREAKTHROUGH IN HELICOPTER BRAKING**

We have applied decades of experience in carbon technology to develop innovative braking systems for the helicopter market. Our brakes are designed to be lighter, more reliable and highly efficient.

Our program of continuous development is geared at providing helicopter platforms with next generation landing and braking systems that are not only reliable and easy to maintain, but lighter, quieter, more cost-efficient and robust.

**CUSTOMERS:**

- Airbus Helicopters
- Sikorsky
SAFRAN’s Full Range of Helicopter Avionics Systems covers flight control, inertial navigation, data analysis, observation and mission management.

**PILOTING AND NAVIGATION INERTIAL SENSORS**

- Using the most modern technologies (FOG, MEMS, HRG), Safran designs, produces and supports sensors, attitude heading reference systems (AHRS) and GPS/GLONASS/Inertial navigation systems (SKYNAUTE).

**COCKPIT AND AUTOPILOT ACTUATION**

- Safran’s smart electro-mechanical actuators are installed in series with trim actuators and managed by the flight control computer.

**AIRBORNE IR ELECTRO-OPTICAL SYSTEMS**

- The Euroflir family delivers the highest level of performance for demanding missions worldwide: maritime patrol, homeland security, border and coastal surveillance, SAR, CSAR and special operations.

**FLIGHT DATA MANAGEMENT**

- From throttle control assemblies, active side sticks to illuminated switches and displays panels, Safran offers an advanced range of flight control systems designed to improve flight safety.

- Safran’s Helicopter Flight Data Monitoring solution Cassiopée Helisafe is designed to make the best use of your flight data. Entirely automatic, lightweight and easy to use, Cassiopée Helisafe enhances flight safety and operations and sharpens the maintenance activity.

- Safran’s Engine Control Units are designed to withstand adverse conditions offering the highest level of safety and reliability.

- Based on Safran’s long experience on Full Authority Digital Engine Control (FADEC), Safran’s Engine Control Units are designed to withstand adverse conditions offering the highest level of safety and reliability.

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**AVIONICS & MISSION SYSTEMS FROM INNOVATION TO CUSTOM-TAILORED SOLUTIONS**

- Rotary variable differential transformer (RVDT)
- Inertial navigation systems
- One axis gyrometer for stabilization augmentation system
- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**FLIGHT CONTROL COMPUTERS**

- Safran has 50 years of experience in manufacturing and supporting analog, digital and Fly-By-Wire control computers that meet the specific needs of each customer.

**WORLD LEADER IN HELICOPTER FLIGHT CONTROLS**

- #3 worldwide in inertial navigation systems
- PIONEER in helicopter mission management systems & aeronautical maintenance support
- 12 million flight hours logged by helicopters equipped with Safran avionics systems

**CUSTOMERS:**
- Helicopter manufacturers
- Operators

**COMPANY**

- Flight data management
- Cockpit management
- Flight data recording and services
- Engine control
- Mission system
- Automatic flight control system

**Sensors and navigation**

- Full authority digital engine control (FADEC) or electronic control unit (ECU)
- Electronic optical system (EOS)
- One axis gyrometer for stabilization augmentation system
- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Cockpit voice & flight data recorder (CVR/DFR)**

- Electronic optical system (EOS)
- Control station
- Cockpit display
- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Electro optical system (Euroflir)**

- Rotary variable differential transformer (RVDT)
- Inertial navigation systems
- One axis gyrometer for stabilization augmentation system
- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Semis actuators**

- Trim actuators
- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Commutation**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Actuation**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Cockpit management**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Mission system**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Automatic flight control system**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Engine control**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Flight data management**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Flight control system**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Pilots data acquisition and services**

- Flight control computer
- Flight data acquisition unit
- Flight control panel
- Flight control computer

**Worldwide**

- Full authority digital engine control (FADEC) or electronic control unit (ECU)
- Electronic optical system (EOS)
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**Mission system**

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**Automatic flight control system**

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**Engine control**

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- Flight data acquisition unit
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- Flight control computer
SAFETY SYSTEMS & ONBOARD SYSTEMS
INCREASING HELICOPTERS PERFORMANCE & OPTIMIZING FLIGHT SAFETY

SAFETY SYSTEMS & ONBOARD SYSTEMS
A KEY INTERNATIONAL PLAYER IN AERONAUTIC EQUIPMENT AND SYSTEMS FOR HELICOPTERS,
SAFRAN DESIGNS AND MANUFACTURES HIGH TECH SOLUTIONS FOR TODAY’S HELICOPTERS.

EMERGENCY FLATION SYSTEMS
Designed to enable a helicopter in difficulty to land on water, our emergency flotation systems are light and innovative. Capable of providing stability to sea state 6 and more, they reduce the risks of capsize and submersion during a sea landing.

LIFE RAFT SYSTEMS
Safran has developed automatic and reversible inflatable life raft systems to facilitate passenger boarding. Offering high survivability, our rafts have the advantage of light weight and low packaging volume.

FUEL SYSTEMS
Safran produces internal and external auxiliary fuel systems, as well as all associated equipment (gauges, fuel monitoring panels, etc.), that increase the operational range of helicopters. Backed by many years of experience in the domain of lightweight and flexible aircraft fuel tanks, Safran has reinforced its position in the helicopter market with the development of its own specific mixes and doped fabrics. This strategy of innovation has enabled Safran to develop lighter fuel tank envelopes.

COCKPIT AND LIGHTING SOLUTIONS
A major player in the lighting solutions market, Safran can deliver a complete external lighting system that is entirely LED-based. Safran also produces, for helicopter cockpits, large-scale illuminated panels, keyboards and other control panels.

CUSTOMERS:
• Airbus Helicopters
• Avic Helicopter
• Bell
• Hélicoptères Guimbal
• Korea Aerospace Industries
• Leonardo Helicopters
• MD Helicopters
• Robinson
• Sikorsky

#1 WORLDWIDE IN EMERGENCY FLOTATION SYSTEMS FOR HELICOPTERS
60 YEARS OF EXPERTISE IN EMERGENCY FLOTATION SYSTEMS
O UR FLOTATION SYSTEMS CAN EQUIP 80% OF THE WORLD HELICOPTER MARKET

AEROSPACE SAFETY SYSTEMS & ONBOARD SYSTEMS
INCREASING HELICOPTERS PERFORMANCE & OPTIMIZING FLIGHT SAFETY
SAFRAN PROVIDES LIGHT, MEDIUM AND HEAVY HELICOPTERS WITH PASSENGER AND PILOT SEATING SYSTEMS THAT MEET THE SPECIFIC NEEDS OF THIS DEMANDING MARKET.

INNOVATIVE SEATING SYSTEMS

Based on Safran’s long experience in helicopter seating systems, our products include a shock absorption system designed to optimize pilot and passenger safety. We also offer smart, innovative seat actuation functions for a comfortable in-flight experience.

CUSTOMIZED SOLUTIONS

Safran is aware of the challenge and is designing, manufacturing and maintaining customized technical seats that meet the specific needs. Adapting ourselves to the different requirements of customers, our pilot seats are unique to each helicopter model.

CUSTOMERS:
- Helicopter manufacturers
- Operators
CUSTOMER SUPPORT
Providing comprehensive worldwide customer support

Flexible, Tailored Support

Rotorcraft manufacturers and operators require reliability, flexibility, cost-efficiency and optimized planning. Safran is well-positioned to offer extensive, custom-tailored support across the full lifecycle of rotorcraft programs.

Our global aftermarket offering includes spares provisioning and supply, maintenance, repair and overhaul (MRO), Aircraft-On-Ground (AOG) support, engineering services, real-time data monitoring, logistics management, as well as on-site and technical support and training.

Improving Services Through Innovation

As an innovator, our strategy is to constantly anticipate and introduce new technologies, new production techniques and new materials in order to better maintain and repair our products.

We believe in preventive maintenance, which is why we leverage our expertise in data analytics to diagnose and forecast maintenance needs.

Global Reach, Local Support

With facilities strategically located in major aviation hubs, we meet the demands of fleet operators, while strengthening ties with our customers. This strategy enables us to provide immediate, efficient and reliable support, ultimately improving dispatch reliability.

Certified Service Centers Worldwide

- Support by the Hour
- Training and Consulting Services
- 24/7 Customer Support and Services
- Distribution Centers
- International Repair Network On-Site Support
- More than 200 technical representatives worldwide

• Boost® (Bank of online services & technologies) is Safran’s new online rotorcraft engine maintenance management service. Developed in partnership with IBM, this tool provides operators of Safran-powered helicopters with real-time, personalized engine data to enrich their own fleet maintenance management, with the direct support of Safran teams.

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