



Sagem Défense Sécurité
SAFRAN Group

At the cutting edge of European and international technologies

Sagem is a high-technology electronics group that has drawn on the technological and industrial synergies of its two businesses—communications and defence and security—to create a world class company. It is the second largest French telecommunications group and the third largest European defence and security electronics group.

Sagem is the leading European manufacturer of inertial systems and the third largest in the world in the field. It is also the leading European manufacturer of optronic systems and the number one manufacturer in the world of fingerprint-based biometrics systems. In addition, Sagem is a world leader in helicopter flight control and space optics.

Defence & Security encompasses the following three fields:

- **Navigation and Aeronautics** —guidance, navigation, guided weapons, civil and military avionics
- **Optronics and Air-land Systems** —UAV systems, land, marine and airborne optronics, space observation, data transmission and processing and secured communications
- **Security** —biometric identification systems, secure terminals, smart cards and certification

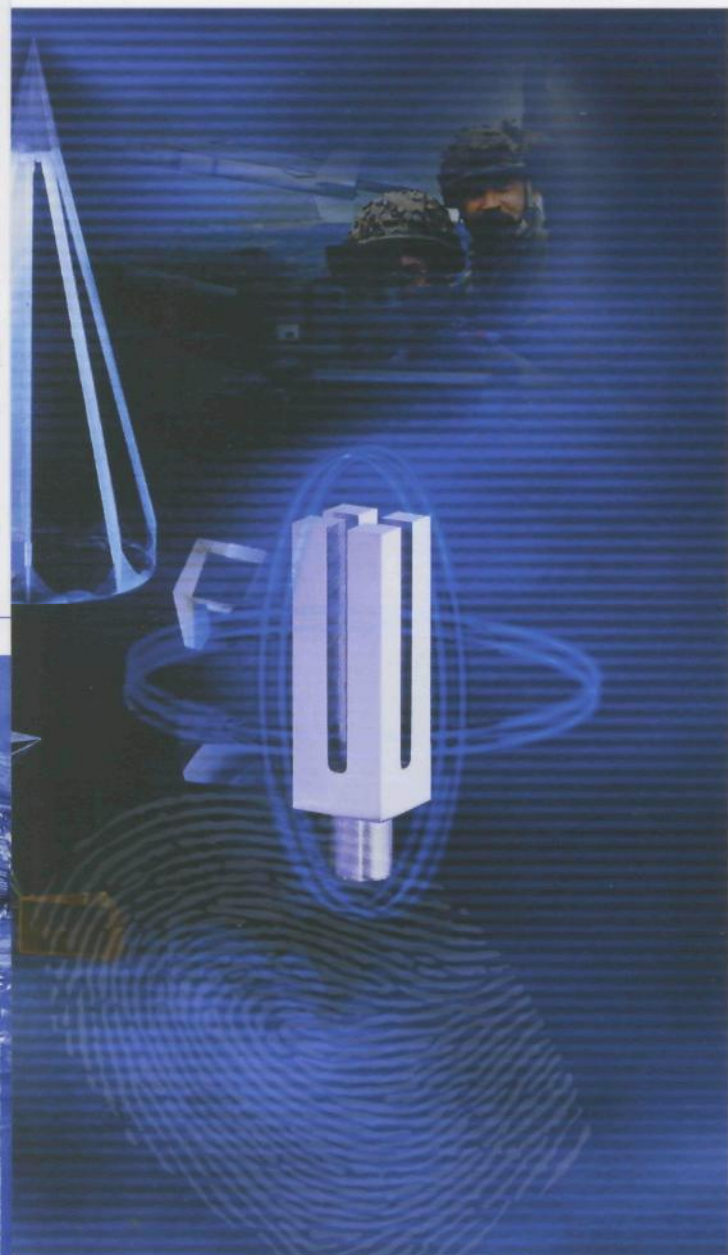


Technological independence

As a European leader in a broad range of technologies, Sagem has set itself the goal of maintaining its international competitiveness in highly strategic areas. This includes high-precision mechanics, optical surface polishing, thin-film deposition, laser and infrared technologies, electrostatic magnetism, gyroscopic sensors and acceleration detectors, microelectronics, signal processing and data transmission.

Sagem's research and development efforts have enabled it to strike an excellent balance among technology, equipment/products and systems.





Fields of expertise

Sagem has earned a reputation for being a world-leading specialist in the following domains:

1. Data/image processing and transmission technologies

Sagem has extensive expertise in data and image processing, including algorithms, software, large-scale database management, encryption, compression and transmission, secure links, radio transmission and data fusion.

2. Infrared optronic technologies

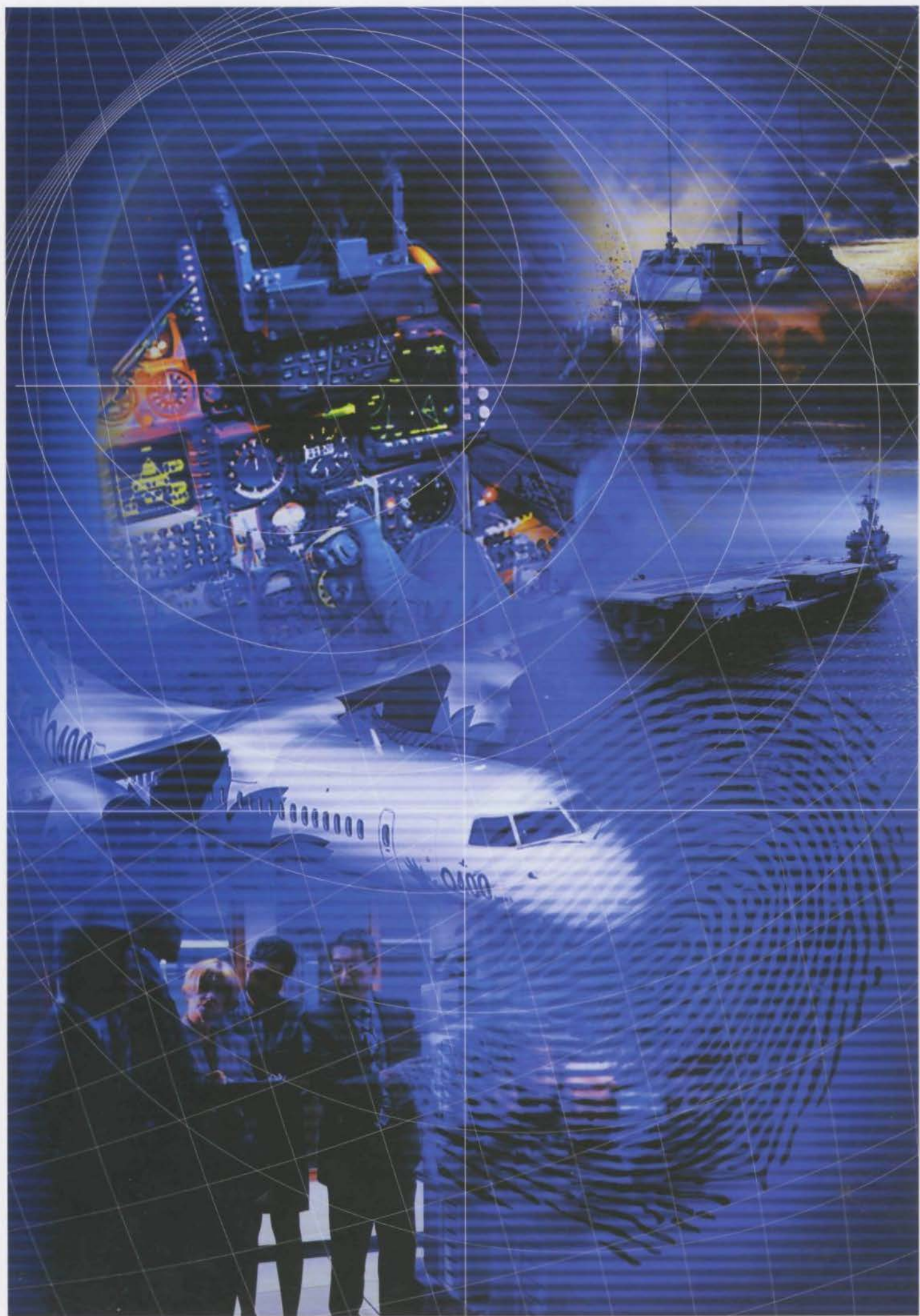
Over the past five decades, Sagem has come to master the full range of optronic technology. This comprises integrated systems and components such as semiconductors and infrared sensing superconductors, high-precision optical devices, micro coolers, piezoelectric scanners, digital processing, modelling and gyrostabilisation. As a leader in infrared technology, Sagem Defence & Security supplies a full range of infrared equipment for observation, detection, warning, terminal homing, search and track, sighting and fire control.



3. Inertial and hybrid navigation technologies

Specialised in inertial guidance technology for forty years, Sagem has developed outstanding skills in the use of gyros. This is especially so for gyrometers, floating gyros, tuned gyros, electrostatic and ring laser gyros and fibre-optic and vibrating gyros. Sagem is also an expert in digital filtering techniques. It applies this know-how to highly integrated systems that combine inertia with various updating modes, such as GPS, speed measurement and terrain contour matching.





Navigation and Aeronautic Systems

Inertial navigation and guidance

Sagem offers a wide range of inertial and hybrid systems for submarines and surface ships, ground vehicles, aircraft, helicopters and space vehicles. Several thousand of these systems are already in service in more than twenty countries.

Sagem has extended its expertise in this area to cover equipment for civil aircraft, from its design and development to the manufacture of all types of airborne systems and ground programming and analysis stations. Case in point, Airbus Industrie has contracted Sagem to supply the information system and the secondary electronic flight control panel for the A380.

Mission planning systems

Drawing on its extensive know-how in inertial navigation, digital mapping and data processing, Sagem has developed products such as the Local Mission Planning and Debriefing System (SLPRM) for the RAFALE combat aircraft. Another mission planning system, CIRCE 2001, has been used by the French air force and many other air forces throughout the world over the past two decades. Furthermore, the company has developed the Operational Communication and Information System (SICOPS Bases) to streamline the management of resources deployed on airbases. Finally, the Military Targeting System (DOREMI) has been designed to optimise the management of target folders.



Helicopter flight control

As the world leader in helicopter flight control, Sagem offers a complete range of aeronautic systems and equipment for civil and military helicopters and civil aircraft. This equipment is extremely important in avionics; it is responsible for key functions such as flight command and control, navigation and stabilisation, data management and airborne maintenance.

Modernisation of avionic systems

Replacing existing aircraft is an expensive option, made even more difficult by widespread cuts in defence budgets. Modernisation is an affordable and effective alternative. Sagem's modular solution for avionic systems upgrades—particularly the MAESTRO system—has been chosen for hundreds of aircraft across the globe. MAESTRO can be configured to be either easy to use (inertial navigation/HUD-type control) or much more complex, with a wide range of sensors and subsystems that cover all types of missions. Sagem also supplies in complete sets or as individual items products and services specifically designed for helicopters. This includes flight control and autopilot systems, secure radio transmission and day/night sights.



AHRS
Attitude and Heading Reference System.



SLPRM
Local Mission Planning and Debriefing System.

Optronics and Air-land Systems

UAV and observation systems

Sagem offers a comprehensive line of UAVs, such as SPERWER, for tactical intelligence gathering, target acquisition and backup for land operations and territorial and maritime surveillance. In terms of civil applications, many security forces in France and abroad have chosen the company's visible and infrared video surveillance systems, which are fully compatible with their helicopters and light aircraft. The STERN mobile digital system, for example, transmits broadcast quality images and sound under the harshest conditions.

Night vision, infrared detection and guidance

The Sagem range of infrared optronic systems covers all operational missions of defence and security forces. The company has already produced more than 3,000 thermal imagers and 25,000 homing devices (MISTRAL, MAGIC and MICA). The French MoD (DGA) has chosen Sagem to produce 3,000 AASM guidance kits. The IRIS and MATIS thermal imager families can cope with all navy, land or aeronautic missions, whether they be for sighting, fire control, surveillance, observation or reconnaissance.

With respect to aeronautics, the Sagem Front Sector Optronic system (FSO) is used on the RAFALE, and the SAMIR missile launch detector is used on the RAFALE and the MIRAGE 2000. As for helicopters, Sagem is involved in the TIGER project with two sights—STRIX and OSIRIS. A version of STRIX equips the South African ROOIVALK helicopter, and Sagem also provides equipment for the NH 90 FLIR.



SAVAN 20
Stabilised day/night gunner sight
(LECLERC tank).



FSO
Front Sector Optronic system.



MATIS LR
Long-range 3-5 µm thermal imager.

Sighting and fire control systems

Sagem has become a leader in the field of optronic sights for applications such as panoramic sights, fire control systems for combat vehicles, helicopter sights, submarine periscopes, trajectory computing systems and optical equipment for infantrymen. Sagem's main references include the LECLERC tank equipped with SAVAN and HL70 sights and the BMP-type armoured vehicle fitted with Sagem sights and thermal imagers. Many other vehicles are fitted with VIGY sights. The DGA has chosen Sagem to develop the FELIN future infantryman system to equip soldiers.

The company is also part of a consortium France's MoD has commissioned to develop the country's network-centric warfare concept BOA.

Regarding armoured vehicle modernisation, Sagem offers functions such as night vision, stabilised sighting, laser range finding and ballistic computation. The company has developed high-performance products for ship anti-missile protection, including the VAMPIR single or dual spectrum IRST, the EOMS multifunction system and the VIGY 20, a lightweight day/night observation and fire control system for small and medium calibre naval guns.

Security

Fingerprint identification systems

Biometric systems are instrumental in ensuring the high level of security demanded by governments, their citizens and the business community. Sagem's latest generation of crime information management systems, METAMORPHO™, includes an Automatic

Fingerprint Identification System (AFIS) that offers unique performance for police forensic applications. This system can provide identification using evidence from the scene of the crime, obtain quick results with sizeable ten-print form databases, carry out palm-print identification, and so on. In addition to this, Sagem has developed its MORPHO™ civil AFIS management system to ensure citizens have the right to public services such as social security and healthcare. It also offers biometric products

that provide convenient and extremely efficient solutions for physical and virtual access control, whether it be for offices, networks or bank accounts.

Secure data transmission

When it comes to secure communications, Sagem provides solutions for PSTN telephony, mobile telephony, fax, e-mail (Intranet and Internet) and card transactions. Thanks to the use of extremely sophisticated digitisation techniques and proven encryption algorithms, the group delivers airtight security for all types of data transmission (text, voice or image). Apart from secure mobile telephones and faxes, Sagem has developed a range of payment terminals (SAGEM Monetel) that features a unique level of technical performance and is compatible with future means of payment. To protect sensitive corpo-



The new EFT930 series
Mobile payment terminals



MORPHOACCESS™
Biometric access control terminal.

rate data, Sagem supplies CONFIDENCE, a range of products, based on public-key encryption technologies (PKI, Public Key Infrastructure) that secures computer networks. Sagem also designs and manufactures smart cards suitable for a wide range of applications: SIM cards, bank cards and ID/security cards. To reinforce airport security, Sagem has developed a range of systems based on biometrics (iris, fingerprint and facial recognition), smart cards, cryptography and secure data transmission. The company is also an expert in designing and manufacturing lottery terminals. As a leader in the field, it offers systems which process all types of tickets.



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On-line lottery terminal.

Defence and Security

Technological independence

Inertial navigation and guidance

Helicopter flight control

Mission planning systems

Guided weapons

Modernisation of avionic systems

UAVs and observation systems

Night vision

Infrared detection and guidance

Sighting and fire control systems

Future infantryman (FELIN) equipment

Fingerprint identification systems

Secure data transmission

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Assault rifle upgrade

Retrofitting the FAMAS assault rifle for FELIN

- 'Push-to-talk' radio remote control
- Weapon sights remote control
- Lowered line of sight for improved ergonomics
- Around-the-corner firing
- New bayonet



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Assault rifle upgrade

Retrofitting the FAMAS assault rifle for FELIN



The FELIN system, and typically the FELIN weapon sights, can be adapted to most assault rifles currently in use. The soldier can activate communication and observation functions via remote controls.

Improved operational capability

The added front handle ensures the weapon can be held effectively in all firing positions, especially when the bipod cannot be deployed.

The weapon can be held securely when the soldier carries out remote sighting, enabling him to remain hidden when firing.

The shape of the handle has been designed to be able to stabilize the weapon in all firing configurations and protect the soldier's hands.

Remote controls

Controls are fitted on top of the front handle, and are accessible regardless of the soldier's position. Thanks to markings, they

can also be used in the dark. In addition to this, they allow the soldier to do the following without letting go of the weapon or looking away from the target:

- Acquire a target, fire and use the personal radio
- Carry out remote observation
- Capture images and video sequences
- Change the weapon sight field of view
- Modify the weapon sight settings (day/night)

New weapon aiming system

The top and front parts of the FAMAS assault rifle have been modified and equipped with a Picatinny rail. This ensures a perfect interface between the weapon and the different aiming systems (weapon sight and laser pointer) without modifying the weapon performance. It also improves shooter stealth.

A new bayonet

A bayonet particularly adapted to the needs of the modern soldier has been fitted on the assault rifle.

It can be used as a knife for up-close combat or as a cutter for cables and barbed wire.

Its resistant blade can be used if needed as a lever to lift loads or as a support when scaling high obstacles.



Technical specifications

- Interface: Waterproof, self-release D-CAT connector (standardization pending)



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