Safran upgrades the Charles-de-Gaulle

The French Navy’s flagship aircraft carrier, Charles-de-Gaulle, which has been on mission since January 2015, is now fitted with new navigation and optronics equipment supplied by Sagem (Safran).

Capable of carrying up to 40 aircraft, the nuclear-powered aircraft carrier Charles-de-Gaulle has been conducting in the interest of France GAN (aeronaval group) operations around the world for 15 years. Under the project management of the DGA\textsuperscript{1}, and the prime contractor DCNS, the vessel’s refit includes a number of onboard devices supplied by global optronics and maritime navigation specialist Sagem (Safran): the navigation and alignment system, intelligence systems and a number of landing aids.

Navigation: Sagem sets the cap

Thanks to its integrated combat system, the Charles-de-Gaulle is capable of conducting its missions in the most extreme conditions. At the center of the system, Sagem’s inertial units provide the vessel’s navigation functions and run the intelligence and protection systems. "The Charles-de-Gaulle used to be equipped with three mechanical inertial units, which we are going gradually to replace with SIGMA 40 laser gyro units," explained Bruno Bellanger, Head of Programs in Sagem’s Avionics division. "These very high-precision devices are totally immune to the vibrations and temperature variations encountered in combat."

Another major advantage of these units is their great versatility. They will now be able to align the inertial units onboard the Rafale aircraft while continuing their guidance missions. "Before these fighters take off, their inertial units need to quickly take their bearings on the geographic north by measuring the earth’s rotation," said Hélène Lecoeuche, Military Aviation Key Account Director in the Avionics division. "This operation, known as sea alignment, is particularly touchy because, on the flight deck, the aircraft is no longer linked to the earth. The aircraft carrier’s laser gyros therefore transmit the information about the ship’s movement to the devices onboard the aircraft so that they can compensate for the movements in relation to the earth and align themselves."
**Safran**

The EOMS-NG system (Electro-Optical Multifunction System – New Generation).

**Optronics, guaranteed safety**

Other equipment to be upgraded by Sagem: the optronics intelligence systems. Linked to the aircraft carrier's combat system, they are used to detect, then, identify, any airborne or surface threats. "*Before the optronic devices become obsolete, the it has been decided to replace them with the EOMS NG (Electro-Optical Multifunction System – New Generation)*," said Pierre-Olivier Nouguès, Head of Sagem's Marine Optronics department. "*This product - the only one of its kind in the world - combines an intelligence unit and a long-range infrared panoramic tracker with an electro-optronics fire control system. These sensors will be installed during the Charles-de-Gaulle's next maintenance period.*"

The DALAS laser landing aid will also be upgraded. "*This system is essential, because it gives the landing deck officer information about the position of approaching aircraft with an extremely precision. The information provided by the DALAS system is of prime importance for the officer, who can, if necessary, ask the pilot to go around for avoiding an accident. The new system will be delivered in early 2017.*"

**Serving the French Navy**

Sagem has developed extremely sophisticated digital simulation models in its laboratories for all of these systems. The goal is to ensure that the new systems work perfectly when they are installed onboard, without having to run a series of tests, which would be incompatible with the vessel's operational readiness date. "*The high standards set by the DGA are proof of our country's vast experience in field operations. We are proud to be using our advanced technology to serve the French Navy's most emblematic vessel,*"
"concluded Fabrice Delhaye, Head of Sagem's Navigation department.

1 Direction Générale de l'Armement, the French government's defense procurement agency

Watch the Charles-de-Gaulle anniversary TV show originally broadcast on January 1, 2015 on France 2:
http://pluzz.francetv.fr/videos/les_stars_fetent_les_15_ans_du_charles_de_gaulle_,114965213.html

Sagem, a high-tech company of Safran, holds world or European leadership positions in optronics, avionics, electronics and safety-critical software for both civil and military markets. Sagem is the No. 1 company in Europe and No. 3 worldwide for inertial navigation systems (INS) used in air, land and naval applications. It is also the world leader in helicopter flight controls and the European leader in optronics and tactical UAV systems. Operating across the globe through the Safran group, Sagem and its subsidiaries employ 7,500 people in Europe, Southeast Asia and North America. Sagem is the commercial name of the company Sagem Défense Sécurité. For more information: www.sagem.com