

# The French AOC's Newsletter N° 21

May 2004

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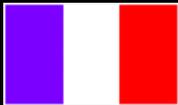
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## LE MOT DU PRESIDENT



In spring 2004, our 8 year-old Chapter is especially marked by the mid-May international Symposium organised in Rome, by our Italian friends.

The last months have been punctuated by significant changes for our national community : the decision-making structures of the Ministry of Defense have developed in giving the Joint Chief of Staff a more clear arbitration role ; a major turning step has been passed with the first meeting of the Committee of Systems of Forces. Also people change : in particular, Yves GLEIZE who left his position at the Délégation Générale pour l'Armement to François LUREAU, already close to many of us. In Europe, OCCAR is now led by Admiral Cardinali who has taken over von Dr. von Sperber. Admiral Cardinali has been given many positions of responsibility in Electronic Warfare during his career in the Italian armies.

This European Defense Agency is no longer a virtual idea. A core team has been nominated to elaborate the basic texts about to define the agency operating modes, in particular in the short and the middle term ; this applies to the agency's interfaces with the national and international existing structures. Here feature topics are tackled, which will be significant for our sector, and probably, more generally, for the very concept of European Defense such as its positioning next to the community and intergovernmental entities.

Closer to us, in everyday life, the daily news make us unfortunately more and more aware of terrorism. We must constantly care what our expertise areas can provide to fight the hydra. There are many possible lines of implementation : on its front page, the Monde's issue of 10 March reminds us that the Rwanda tragedy practically started when two SA16 IR missiles were shot against President's Habyarimana's Falcon aircraft. The Madrid attack of 11 March pinpoints how much other EW technical means can be useful in this type of fight. Thus, a real awareness is essential for all experts to federate energies, find new ideas and suggest solutions to recent threats, some of which incurring the risk to be detected too late. This burst of defense of freedom is expected after the dreadful Spanish events - and the ensuing extreme solidarity is the most beautiful tribute we could pay to our bruised European fellow citizens who have been taken as a target.



**Bruno Berthet**  
*Président of Guerrelec*

début

## Hélios II, Syracuse III & Essaim : 2004 milestones in French military space programmes

This year will be a crucial one for France as three new systems go into orbit : the Helios 2A image intelligence satellite, the Essaim constellation of electromagnetic intelligence satellites and the Syracuse III telecommunications satellite. To fully appreciate the strategic importance of France's military involvement in space, Guerrelec invited General François Fayard, director of SPOTI, the DGA's observation, telecommunications and information programmes department, to speak to more than 100 defence professionals at the Ecole Militaire (Paris) on 4 February.



*L'IGA François Fayard, Director of the SPOTI*

François Fayard considers space, especially military space, to be an essential component of information dominance and, more specifically, of network-centric warfare: "While the United States has a comprehensive space-based capability," he said, "France's military satellite systems, although far fewer in number, are performing remarkably well. When the Helios 1A military observation satellite was launched on 7 July 1995, its guaranteed lifetime was five years, but nine years later it's still going strong!" Under French defence policy, Fayard explained, the primary objective of the space programme is to provide unrestricted, independent access to the entire globe. Space-based systems allow us to observe remote regions with high discretion and low vulnerability. The new Helios 2A satellite will cover the visible and IR spectra and provide enhanced imaging capabilities. And, as well as the diplomatic and military intelligence services provided by Helios 1, Helios II will be oriented toward joint theatre and tactical operations, with a total of fourteen operational entities having access to its data. "As an independent source of intelligence, Helios II forms the spearhead of France's strategic independence," stated Fayard. The estimated cost of Helios II is 1.52 billion euros (\*). The Syracuse III military telecommunications satellite, with its nine SHF channels and six EHF channels, will also represent a great technological leap forward. The Syracuse III programme represents an investment of 2.42 billion euros and will be interoperable with other NATO space assets.



*The French satellite Helios II*

For the systems of the future, a number of demonstrator programmes are currently underway, including the Essaim SIGINT system, a constellation of four 120-kg mini-satellites that will be operated by CELAr weapon electronics centre, just like Cerise and Clémentin, which have yielded excellent results. Essaim will cost a total of 79.3 million euros (including 9.5 million for operating costs) and provide a round-the-clock geo-location capability. This demonstrator concept has a bright future ahead of it, and a new SIGINT constellation, Essaim II, is planned for 2008. The other major demonstrator is Alerte, also scheduled for 2008, which will use two satellites to detect long-range missile firings. "Alerte's job will be to gather and analyse terrestrial background and missile signatures, based on a principle similar to that of the Mirage 2000's DDM infrared missile launch detector. This will be a major step towards specifying the performance requirements of a space-based missile defence capability," Fayard explained.

For many years, France has been the only European nation with a significant military space agenda. Today, the European dimension is crucial : Helios images will be cross-cued with those of the German SAR Lupe and Italian Cosmo-Skymed satellites. With space programmes currently accounting for 20% of the French defence procurement agency's R&D budget, François Fayard considers France's space policy to be compatible with its national requirements.

*An interview by P. Wodka-Gallien*

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(\*) The budgetary data and some technical information were taken from the 2004 parliamentary finance bill. Report no. 1114, volume 3. French National Assembly. Space, Communications and Intelligence. Yves Fromion. Member of French parliament..

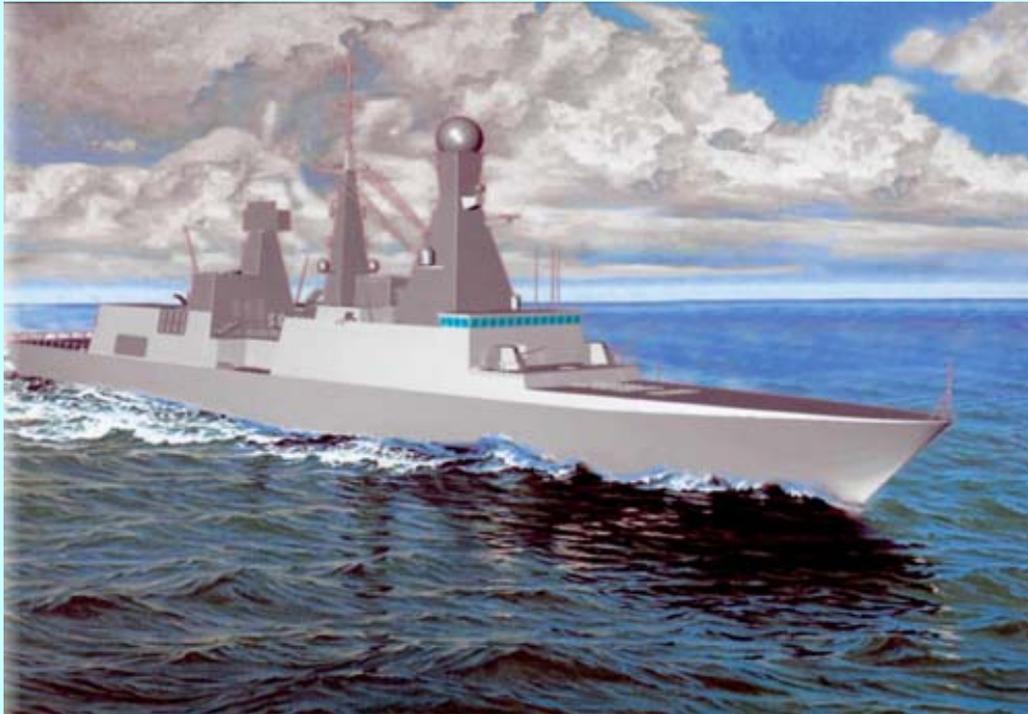
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## **Naval Electronic Warfare in France : the latest evolutions**

French EW has been evolving very fast from last few years mainly due to new major naval acquisition programs as Horizon/Orizzonte and FREMM Multi-Mission frigates, new generation decoys developments and evolution of enlarged self-defence concept.

### Horizon frigates and EW breakthroughs

HORIZON French and Italian frigates have been purchased in 2000 and will enter into service from 2007. This program is a major improvement of EW capabilities, the main EW functionality's on Horizon frigates being participation to tactical situation evaluation, self defence and force defence.



*An artist view of the future HORIZON/ORIZZONTE class frigates being designed for the French and Italian Navies. State of the art EW platforms, these ships will make theirs as well the latest developments in network centric warfare. The first ship of the new "Forbin" class will enter French Navy service in 2007.*

The firms involved in this programme are :

- Sigen (Thales and Elettronica) for the Electronic Warfare System composed of RESM (radar ESM), RECM (radiocommunications), EWSS (Electronic Warfare Support System), EWC2 (command & Control) and PBU (Digital Pulse Blanking Unit),
- Thales for France only for the CESM which is a new development called FIGN,
- EADS for France for the decoy launching system.

The Critical Design Review of the program has been successfully passed in 2003 and installation of assets on the Shore Integration Facility based in Toulon has begun. Major technological improvements are:

- Very high sensitivity and goniometry precision of RESM combined with high POI and spectral numerical analyser allowing intra-pulse measurement,
- New generation of CESM,
-

Active antenna for RECM with DRFM (Digital Radio Frequency Memory) allowing coherent jamming modes,

- High jamming power,
- Very fast jammer response time for reflex action in order to deny target acquisition of seekers and targeting radar,
- Numerical Pulse Blanking Unit (PBU) fitted to cope with high RESM sensitivity and high jamming power,
- Programmability from global EW tactics to waveform generation at the lowest time-scale precision,

Helping CMS for Emcon (emitter control) plan, Kill assessment, fight against stand-off jammers, definition of combined hard-kill/soft-kill tactics are fully integrated.

The bi-national programme is managed by the HORIZON office program (Ufficio di Programma Orizzonte) led by Admiral Dino Vene. Based in Issy-les-Moulineaux (near Paris) with an annexe office in Toulon and in Roma, this 25 person organisation is reinforced by several experts coming from each HQ (including Lieutenant Commander Socce and commander Ferragu for France), from the DGA and from its Italian counterpart Navarm with expert teams from test centers of both nations ; for France, the technical center of naval systems of the DGA in Toulon.

### **A new generation of decoys**

French Horizon frigates equipped with NGDS launchers have the capability to launch in particular the Seaclad family produced by Lacroix composed of Sealem and Sealir decoys.

These decoys are close from the Sagaie NG decoy type developed specifically to equip France's anti-aircraft frigates and the aircraft carrier Charles-de-Gaulle in 2005. The Sagaie NG operation has been developed to provide credible decoys since chaffs have been from a long time easily discriminated through a lot of various techniques...

Several trials have been performed with success against measurement assets, missiles and airborne radar giving high confidence in the performance of the product. On-board final integration tests will occur in the second half of 2004.

Compared to active off-board decoys, two main interests have to be considered:

- the cheaper cost of these new generation decoys,
- a high robustness to many seeker ECCM which, to be countered by an active decoy, implies to increase the cost of the payload.

Nevertheless, the counter-measure domain should continue to evolve in the future, Horizon frigates being open to a lot of solutions due to the high modularity of NGDS launcher.

### **Enlarged self defence tactics, NATO's SWG4 trials and Arpège NG**

Enlarged Self-defence and Force Defence is a concept that is part of all new French ships equipped with EW. Efficiency of such tactics has been demonstrated during the SWG4 NATO trials organised by France (Toulon - 16th-24th of September 2002). These trials involved ships from France, Italy, Spain, Turkish, a US Lockheed P-3 Orion from the Naval Research Laboratory (Washington-DC) equipped with seekers and shore equipments from Denmark, France and Italy. The results obtained, including combined hard-kill and soft-kill tactics, could be included into standard NATO tactics in the near future.



*Live firing at sea of an Etienne Lacroix new generation decoy.  
A type that is to equip the futur HORIZON frigates for self-defence duties.*

These trials demonstrated also the necessity to have airframe integrated seekers and not shore-based to evaluate the efficiency of tactics dedicated to high value capital ship protection for which geometrical aspects are specifically important. Hybrid bench tests with real seekers in the loop, like those used at the CELAr test centre (In Rennes, France) are also well fitted to the definition of these tactics and to obtain their efficiency.

For sea trials, SWG4 sustains with the participation of France the NASMDEF NATO project. In parallel, France has currently in progress the ARPEGE NG programme. The ARPEGE NG aircraft will be equipped with two seekers, simulation integrated tools and analysis assets. It will be available at the end of 2004 with one seeker and with two seekers in 2005. Based on a Falcon jet, this program involves Thales for the seekers, Dassault Aviation and AVDEF, a subsidiary of EADS specialised in EW threat simulation aircraft mimicking opposing forces.

### **Future perspective**

The above listed views and developments obviously show that EW has been evolving very fast from the last few years in France. On-board programming of these systems will allow increases in the future the tactical developments. FREMM frigates procurement is currently under discussion between France, Italy and their industrial partners. Due to the number of ships involved (27 units) the final procurement decisions should have a strong impact on the future of electronic warfare in France.

In this highly selective domain, as well as in connected applications, French naval EW is in constant evolution in a context largely made of international cooperation, with the DGA paving the way for month after month improvement in partership and far flung expertise.

***IPA Philippe Bertrand***  
***Head of the DGA's Naval EW dept.***  
[début](#)

# SIGINT against asymmetric threats : a new hope

How SIGINT has become a key feature ready to address a plethora of new and elusive threats

SIGINT is blessed with the highest virtues. Radio communications monitoring exposes the very intent of a foe, and analysis of his radar signals discloses his posture and sends valuable warnings against an imminent attack.

However, the end of rival blocks which marked the twentieth century has deeply questioned this paradigm. A pattern of predictable threats gathering similar adversaries against commonly agreed rules of fight has left the ground to multi-faceted threats wielded by non-state, non-military, and even unarmed foes. Al Qaida, organised crime, or computer hacking could respectively fall under these categories. Simultaneously, this strategic shift meets a revolution in information and communication technologies, broadcast over networks in digitised format with an unprecedented pace in a global economy. Established military technologies, such as fixed radio networks or air defence systems shrink, whereas former government-only assets reach consumer markets, such as these small digital hand-held radios, low-power and frequency-hopping, featuring encryption keys and offering interoperability on a scale never dreamed of by military networks : cellular phones.



*FLEAS is a versatile self defence system developed to counter all kinds of mobile field radio-communications. It even pinpoints lower priority radio-bands to low power jammer, thus revealing itself a smart answer to the new asymmetric threats mainly posed by terrorism.*

## From SIGINT to information warfare

This abrupt change forms the new deal of a geostrategic environment commonly defined as asymmetric, where the threat organises itself by antagonising its target's rules of engagement. Signals intelligence, once organised against the dense military networks of the Warsaw Pact, has been forced to take into account not only the motley resources of Southern States, but, more reluctantly, the utmost refinements of booming commercial communications.

More importantly, SIGINT now has to face less and less cooperative signals, with voice and data sharing in the civil spectrum, with monitoring turned into a luxury thanks to fast-spreading standards and protocols or widespread encryption. Listening-in gives way to spectrum and network monitoring, and electronic order of battles to unstructured groups or individuals, exchanging weak signals through PMRs, personal phones, portable satellite terminals or internet providers. Dealing with such threats pose a major challenge to SIGINT agencies, and often require the cooperation of legal authorities. Recent operations in Yugoslavia, Afghanistan, or sub-saharian Africa thus led to a deep transformation of modes of operation, target acquisition and monitoring, and most of all exploitation and dissemination of SIGINT, which now clearly favours radio signals. But processing those weak signals provides results only when combined with knowledge-based (mainly semantic) exploitation tools, and merged with other intelligence sources (mainly image-based).



*A French Army VBL scout armoured jeep seen during an ISAF mission in Afghanistan*



*The Force Protection Jammer (FPJ) designed by Thales. It is basically an "intelligent" radio communication jammer aimed at protecting land convoys against remotely detonated mines or voice communications between forces placed in ambush.*

Another evolution of SIGINT shows a trend to closely cooperate with its active EW counterpart. Digital signal processing and software-based sensor exploitation come to the rescue to offer finer analysis of intercepted signals, with gathering of steps, demodulation and decoding leading to neat bit streams, or providing identification functionalities close to the fingerprinting of radars. However, interception, de-interleaving and technical analysis often call for further decryption and language analysis, and these complex steps are seldom performed in a timely manner. This is why, when signal cannot be efficiently monitored nor precisely located, it may be preferable to use the same powerful tools to track it in time, space and spectrum and apply selective and multi-mode counter-measures. Jamming, denial or intrusion against previously recognised signal thus enhances SIGINT measures, by forcing adversaries to increased traffic, or even degraded communication means. Here, ESM and ECM combine to

produce information operations. Lastly, digital signal processing allows update of databases and threat libraries associating technical characteristics, physical support, network analysis, or even individual subscriber description. Action against radio signals can then offer self-protection, similarly to radar counter-measures. Identified sub-bands or selected network nodes, down to an individual emitter, become vulnerable to denial or intrusion by a spot or follower jammer. Hence the radio-detonated bomb neutralised last winter by an escort jammer in President Musharaf's convoy, or the three GSM-triggered bombs found intact in Madrid train station on March 11th. Such recent examples offer a hint of the wide potential borne by these new ESM/ECM protection capabilities designed to operate on the new peace-crisis-war continuum. This potential is further enriched by the inclusion of SIGINT in a multi-source intelligence processing capability. Cross-cueing of multiple sensors perform the full scope of missions, from early warning to position-fixing, and can provide identification of weak signals with little room for false alarms.

For example, inclusion of MASINT (measurement and signature intelligence) sensors in a SIGINT network, in the form of seismic, acoustic, magnetic or infrared detectors, enable SIGINT systems to deal with threats in radio silence, or provide operators with an early warning on a theatre without front nor rear. Left with little radar signals to focus on, aircraft self-protection is clearly following the same trend to meet new, stealthier threats. In the fight against SHORADS and MANPADS, the array of self-protection devices now reach towards civil airliners and peer in multiple spectrum bands : infrared or ultra-violet analysis to detect and track missiles on launch, new electro-magnetic missile approach warning, or multi-band jammers and decoys combine to provide efficient counter-measures.



*Protecting civil airliners against the terrorist threat posed by shoulder-launched infrared guided missile (MANPADS) is today an obvious challenge for the world EW community.*

SIGINT has thus radically transformed itself to face a more diverse threat pattern. Network-enabled capabilities incorporating multi-source fusion and knowledge-based exploitation allow detection, processing and exploitation of the weakest signals to sense, understand, and act in a discriminate manner against non-cooperative threats operating in a civil environment. Intelligence manoeuvre has come of age to supplant mass manoeuvre, offering a clear-cut operational advantage against current asymmetric adversaries.



*French Army VLRA trucks assigned to the 41e Régiment de Transmissions supporting ISAF troops in Afghanistan. Easy targets for a determined adversary, especially while they are on the move in guerilla torn areas, such soft skinned military vehicle can nowadays protect themselves very efficiently against makeshift remotely radio (or cell-phone) detonated mines by using a new generation of low-power radio jammers.*

*Valéry ROUSSET, Member of Guerrelec  
[début](#)*

## The French Army in the 21st century : towards network centric warfare

The French Army is fully cognizant of the crucial importance of information dominance in the modern digital era. This was the message behind a presentation to defence correspondents on 22 October 2003 by the French defence procurement agency's CELAR weapon electronics centre. Directed by IGA Miquel, CELAR specialises in information warfare techniques, and ran a series of dynamic demonstrations of the new information and tactical communication systems now entering service with France's land forces. The French Army has long been aware the benefits of information technologies. The innovative Atila artillery automation programme, launched by the Ministry of Defence back in the 1970s, was a precursor of the era of battlefield digitisation. In the 1980s, the Army pioneered the RITA tactical network, the Syracuse 1 military satcom network, and the PR4G fourth-generation ECCM radio system with its frequency hopping and free-channel search capability, which entered service in the early 1990s. But the next step - networking command information systems with radiocommunications and distributed sensors - was still some way ahead. This would deliver real-time situational awareness shared by different levels of command, thereby speeding decision-making and execution of orders. So it was that DGA embraced the concepts of network-centric warfare (NCW) emerging in the United States.



*IGA Alain Archinitini, deputy director of the Service des Programmes d'Armement Terrestres (SPART), seen with IGA Arnaud Miquel, director of the CELAR*

In the 1990s, Aerospatiale and Matra (both now part of EADS), Thomson-CSF (now Thales) and Sagem worked with the procurement agency (DGA) and the French Army on four command programmes: SICA at strategic level, SICF at theatre level, SIR at regimental level and SIT for armoured vehicles (Leclerc, AMX-10 RC, VBL). Added to these were the ATLAS

programme (automated firing and datalinks for field artillery), combined with the new Rapsodie ground surveillance radar. Replacing the Ratac and Rasit radars, Rapsodie interfaces with ATLAS and SIR to complement the Cobra counterbattery radar. As demonstrated by the French 155-mm guns deployed at Mount Igman during the Bosnian civil war in 1995, this combination would provide the land forces' with an effective first-round-on-target capability. But beyond the benefits of new technologies in terms of operational effectiveness, the French Army was also keen to align itself with other modern NATO land forces pursuing battlefield digitisation programmes in order to play its role in coalition forces. This was the rationale behind the ASCA programme (Artillery System Cooperation Activities) initiated at the start of the 1990s by Germany, the United States, the United Kingdom, Italy and France. "The purpose of ASCA was to provide a means for sharing information between firing assets - for example, to enable France's ATLAS artillery fire control system to cue fire from US guns," explains Lt. Colonel Bernard Castel, responsible officer for the ATLAS programme. At the same time, the French Army's helicopters and air defence systems have moved into the digital era, with SIR links to Tiger helicopters, the Martha ground-air coordination system, and progressive deployment of an air mobility command system incorporating an SIR on a command helicopter and SITs on other combat helicopters.

As a result, the Army will achieve seamless command with the Tiger by 2005 and with all French Army helicopters by the end of 2007. Today, the French Army is quickening the pace of its digital transformation, with plans for 752 SIR vehicles, 650 SITs, 9 ATLAS systems, and 65 stations and 32 command vehicles for Rapsodie. These are large-scale programmes: SIR represents a budget of €380 million for Phase 1 and its 752 VPCs; the 9 ATLAS regiments and their two Cobra batteries €280 million; €26 million to prepare Rapsodie; and €44 million for V1 versions of the 650 SITs.

Electronic warfare obviously will play a vital role in this continuous process, not only in terms of electronic countermeasures such as jamming and intrusion of enemy networks, but also in terms of hardening and increased security for our own information systems. For IGA Laurent Guibert, C3R force system architect at DGA/DSP, "electronic warfare is fundamental to NCW: it stops the adversary obtaining information about friendly assets and confuses him about what is happening in his own information systems." By the 2010s, the future of the digitised battlespace will take shape around the BOA cooperative fighting system concept, which will combine combatants, UAVs, weapon systems and land robots.



*A clear example of the digitization level now achieved by the French land forces : Thales' ATLAS Canon system on display the CELAR in Rennes. Nine regiments will be equipped with this system operated in combination with COBRA radar batteries.*

#### **French Army command systems and their prime contractors**

**SICA** : Système d'Information et de Commandement des Armées/EADS

**SIC-F** : Système d'Information de Commandement des Forces/Thales Communications

**SIR** : Système d'Information Régimentaire/EADS (ex Matra Cap. Systèmes)

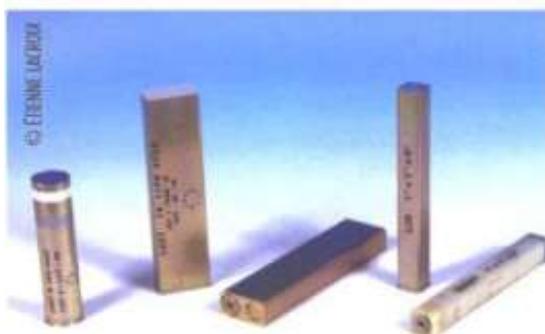
**SIT** : Système d'Information Terminal/Sagem

Philippe Wodka-Gallien

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## Back on the AOC Dayton (Ohio) symposium

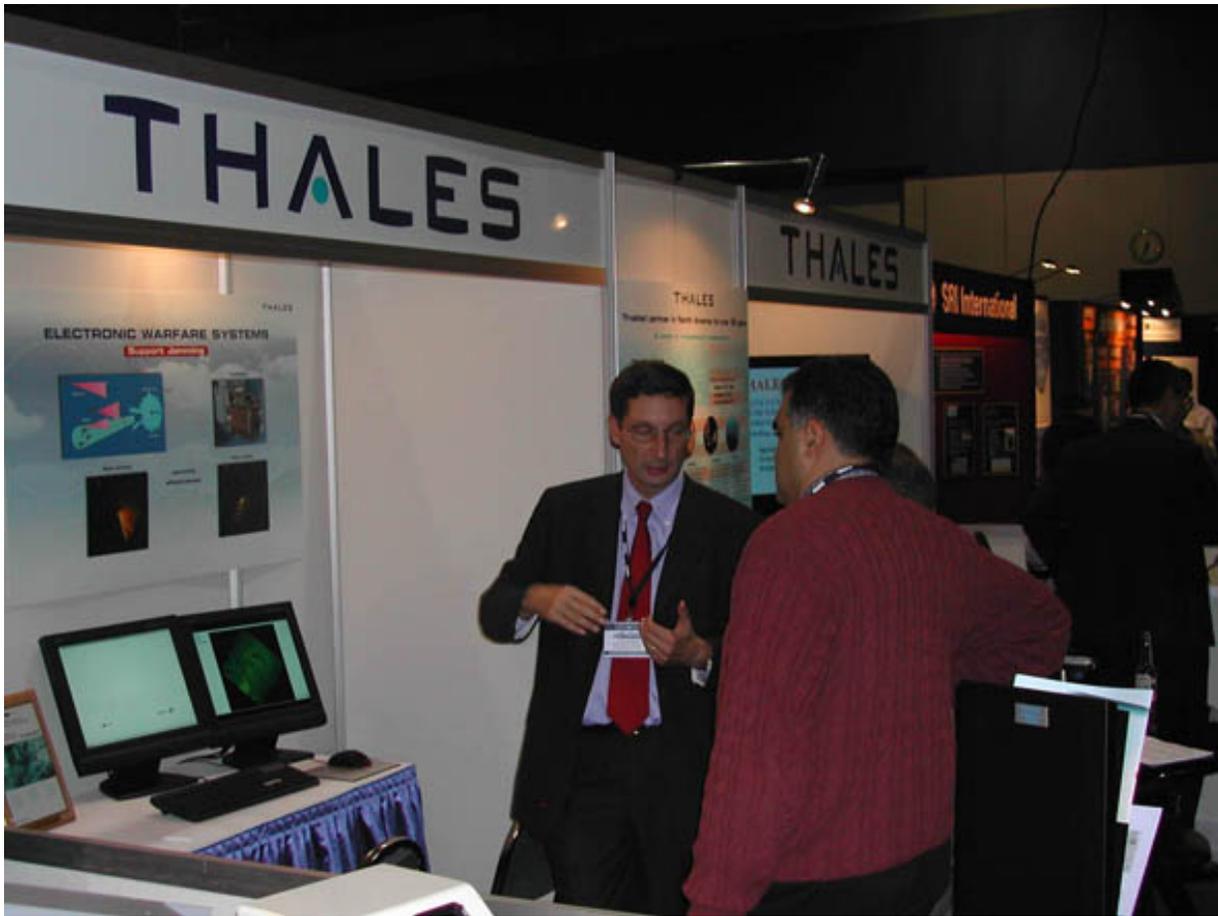
The association of the Old Crows gathered over 1,000 EW and information warfare experts for its traditional annual Symposium in Dayton (Ohio), USA, from 21st to 25th September 2003. In fostering the US needs, the lecture program " EW transformation and Information Dominance in the 2nd Century of Powered Flight " has consolidated the two EW concerns in the USA : the domestic threat and the EW armament of OPEX forces, with Iraq and Afghanistan background. Several projects were offered on the booths beside the focus on multi-sensor architectures and self-protection solutions for civil aircraft in front of IR missiles : a B-52 for stand-off jamming or anti-tamper program for EW equipment in case of a capture by the enemy, a lesson learnt in the US Navy EP-3 Aries kidnapping in April 2001. France was naturally there with several Guerrelec delegates and two companies, Thales and Etienne Lacroix.



*The new Etienne Lacroix decoys now equip the Spanish Air Force SF-18 Hornets*

Beside its well-known EW skills on its booth, Thales has exhibited a stand-off jamming solution derived from the Carbone demonstration jammer as well as a demonstration of emitter precise targeting for anti-radar operations (SEAD). For Etienne Lacroix, a company dealing with self-protection passive decoys, the symposium focused on the announcement of a new subsidiary in Montreal, Pyrotronics Inc. Furthermore, Etienne Lacroix has just introduced a new product line of bi-spectral decoys. These " Dual Band " decoys which were tested at the NATO

EMBOW trial in 2002, can fight the latest generation IR guided missile. The next international AOC symposium will be held in San Diego in October 2004



*The Thales booth at the convention*



*A USAF CIM-10A Bomarc missile preserved at the entrance of the US Air Force Museum at Wright-Patterson AFB. This active guided ground to air missile of the sixties boasted a 250 NM range and could reach a target up to 60 000 ft. It was fitted with a modular 7 to 10 kt nuclear warhead.*

*Philippe Wodka-Gallien*

[début](#)

## "La Fayette" visits the USAF Museum at Wright-Patterson AFB

As the main attraction of the small city of Dayton, Ohion, the Air Force Museum is worth a visit. As the French visitors walk in this fascinating museum for its exceptional masterpieces, in particular regarding Electronic Warfare (notably a rare RB-47 H Stratojet SIGINT or a Republic F-105G Thunderchief armed with SHRIKE anti-radar missiles), they soon discover a richly elaborated stand dedicated to the La Fayette squadron during World War I. With its glorious history, the unit finds its place in the exhibition. The La Fayette squadron which was established in Luxeuil (France) on 18th April 1916 by American volunteers willing to fight at the French's side marks the US military aviation's baptism of fire under the French colors, in the sky of Champagne region. Thus deeply moved GUERRELEC members of the AOC La Fayette French Chapter who participated in the 40th AOC conference have lingered across the wide exhibition hall dedicated to the French-American friendship. The museum, which owns a magnificent "Spad II interceptor decorated with the legendary Sioux-head, shows French uniforms, items of everyday life and very moving pictures of American pilots (see Letter N° 13 on [www.guerrelec.asso.fr](http://www.guerrelec.asso.fr)). Surrounded from beginning to end by the heroic World War I atmosphere, as could be described by Jean Renoir in "The Great Illusion", the visitors come out waving a pennant offered by the EC 2/4 La Fayette squadron of the Strategic Air Force equipped with Mirage 2000 N (nuclear) and ASMP missiles : at last the present has paid a tribute to the heros of the past.

*Philippe WODKA-GALLIEN, Guerrelec*

[début](#)

## ENERTEC's VS2200 recorder operational on the NH-90

ENERTEC was awarded a contract for the supply of digital recorder for data and video aboard the helicopters scheduled for Northern Europe. The contract placed by AUGUSTA is for 34 VS 2200 removable cartridge board recorders architected for the acquisition of 4 STANAG 3350 A video sources and 3 redundant MIL-STD-1553 B. The VS 2200 recorder has been designed for mission feed-back and is an off-the-shelf product available with hardened cartridges ; it can register voice and data in asynchronous mode on the whole mission duration (typically over 4 hours) without changing media. Besides, selected data replay can be performed aboard without any interruption of the recording. ENERTEC provides data recording solutions for aeronautical and naval, thanks to the latest disk and static memory technologies. The VS 2200 deliveries for the helicopter program will be terminated in 2008.



*Bruno BERTHET, Président of Guerrelec*  
[début](#)

## **L'ERGE : Communication electronic warfare in the French Air Force**

At the annual meeting organised in September for advanced military institutions and military attachés of allied nations, the French Air Force made its customary presentation of its capabilities, with special emphasis on the steps it is taking to adapt to new military requirements. In addition to combat roles, including cruise missile, transport, special forces operations, C2 and air defence, there was a clear focus on the Air Force's intelligence gathering capabilities, both multi-sensor (radar, optronic and SIGINT) and multi-platform (satellites, aircraft, UAVs, special forces). Nearly all of the Air Force's reconnaissance aircraft were on display at Air Base 123 in Orleans, including a Boeing E-3 F AWACS equipped with an AN/AYR-1 ESM system, a C-160 Transall Gabriel SIGINT and a Mirage F1 CR with an ASTAC ELINT pod to complement its airframe-mounted Omera camera. Added to this impressive array were a Hunter UAV, a Mirage IVP with its CT52 photo-reconnaissance pod and a number of SAIM imagery interpretation stations (MINDS). Above all, the Air Force made the first-ever presentation of its land-based EW system, SCRIBE (\*).

### **SCRIBE : a multi-mission EW system**

The SCRIBE electronic warfare system was developed by French industry in the 1990s as a collaborative effort between Thomson-CSF Communications (now Thales Land & Joint Systems) and Safare Crouzet. Assigned to the ERGE unit (French intelligence and EW squadron), which reports to CASSIC (information and communication surveillance systems air command), SCRIBE is an ISO-containerised system mounted on all-terrain vehicles to provide a complete communications-monitoring and jamming capability.

CASSIC describes SCRIBE's four missions as follows:

- electronic protection of Air Force networks, links and frequency bands through detection and classification of sources of interference
- basic and proficiency training in electronic warfare environments for national, joint or allied forces
- evaluation of transmission system vulnerability
- participation in French Air Force intelligence gathering missions, under the command of the 54th Air Intelligence Squadron, home of the Transall Gabriel, in Metz.



*A SCRIBE radio-direction finding unit put on display  
at Orléans AB by the Metz-based 54e Escadre de Renseignement of the French Air Force*

### **Le SCRIBE in action, from NATO training to protecting the G8 summit**

The Air Force describes SCRIBE as a network of four direction-finders and four jammers, plus a command post. The subsystems can be used separately or in a network, depending on the services required. Specifically, SCRIBE locates and intercepts transmissions, performs technical analysis on intercepted communications and jams the signals. It is air-transportable for deployment out-of-area. Last year was an important one for SCRIBE: in May, the system was sent to Germany on a training mission, the allied Elite New TP electronic warfare exercise with 17 other nations, including the Netherlands, Italy, the United Kingdom, Sweden and USA. In June, it was used to protect the heads of state and government at the G8 summit meeting in Evian. With its modular design and multi-mission capability, SCRIBE is a prime example of the flexibility and adaptability of French electronic warfare systems.



*SCRIBE : Système COMINT de Radiolocalisation, d'Interception, de Brouillage et d'Ecoute.*

**Philippe Wodka-Gallien**  
[début](#)

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**NEW BOOKS IN PRINT**  
**"Introduction to Electronic Defense Systems" by Filippo**  
**Neri Artech House Publishers**

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