

The French AOC's newsletter

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THE CHAIRMAN'S WORD

GUERRELEC 2001 CONVENTION : well done and hurrah for Squadron 2/4 "La Fayette"

As its program director, I am delighted to see that the current issue of 4 ! is dedicated to the Mirage 2000N and to the EC 2/4 which bears the same name as our association. But I do not wish to elaborate about 4. In the first half of 2001 we held our fourth general meeting and the association is now clearly at cruising speed. The early years were marked by very strong growth. The hugely successful international symposium at the Carrousel du Louvre in early 1998 followed by the symposium at the Senate in 1999 encouraged us to continue with this type of event. Henceforth, we should continue at a steady rate and I believe we have managed to do this. I think that our present level of 250 to 300 individual members is a reasonable success.

The now traditional late-afternoon conferences are being held twice a month. Following the day seminar in 2000 dedicated to French electronic warfare in association with other organizations and the launch of themed visits - one of the electronic arms center (CELAr) and the other of the electronic war polygon (MAEWTF/Polygone or PGE), the second half of 2001 will be noteworthy for the visit of the anti-aircraft frigate La Fayette in Toulon and by a SECRET half-day 'French eyes only' dedicated to a review of electronic warfare ten years after the Desert Storm campaign and an appreciation of the lessons learned from the interoperability of the coalition.

This memory of the Gulf war sadly echoes the tragedy that our American friends experienced on September 11th this year. France has always been a staunch ally of the United States since, despite the occasional differences that we may have, we share the same fundamental values and the same determination to defend them.

The attacks were committed within view of the Statue of Liberty which was a gift from the people of France. We have a very close relationship with America and the whole of France was profoundly shocked by this terrible event. Beyond our direct and shared grief, the entire chapter of the La Fayette has brought us closer together. I would simply like to say that we are truly with our American friends.



*ICA Bruno Berthet
Chairman of Guerrelec, the French AOC
La Fayette Chapter*

début

THE FRENCH STRATEGIC AIR FORCE IN THE 21st CENTURY



Since 1964, Strategic Air Forces (FAS) have been playing their part in the French nuclear deterrent. Their role is based on a concept - deterrence - that has today kept all its meaning, even if the threat has changed in recent years.

The political will clearly reasserted by the President on 8 June 2001 shows that changes in the world situation have meant that we are constantly adapting our capabilities in order to fulfil the mission that forms the basis of our country's defence policy.

FAS : serving deterrence

The French concept can be defined by the will and capacity to hold any opponent in fear, whatever its capacity, of suffering unacceptable damage out of proportion with the stakes of the conflict should they attack our vital interests. These aspects remain indissociable from the two principles of sufficiency and credibility. If appreciation of the level of sufficiency is the role of government, the military credibility of the deterrent rests on our operational capacity to permanently carry out the role that we have been given and in particular the technical characteristics of our equipment in terms of efficiency, security and reliability. Based on these elements, the structure of our nuclear forces was redefined in 1996 by the President. It now rests on two complementary components:

- A seagoing component, equipped with ballistic missiles;
- An airborne component, built around air-breathing missiles, making our deterrent flexible, visible and giving it varied modes of penetration.

An important asset is that the airborne component may reinforce the capacities of the air force.

Deterrence should be based on a command organisation and operational forces that should be able to guarantee a strike force in whatever circumstances and prove it. The strategic air forces commander is responsible for preparing and monitoring the execution of its missions. This needs a central organisation allowing the real time "management" of units placed under its orders: this is the role given to Centre d'Opérations des Forces Aériennes Stratégiques (COFAS).

The strategic air force's strike capacity includes:

- Three squadrons of Mirage 2000N with remarkable penetration capacities provided by a highly reliable automatic terrain following system and high performance ECMs, an expandable range thanks to in flight refuelling and a mission preparing system adapted to nuclear technology and medium-range ground to air missiles.
- C-135FR aircraft refuellers, essential for extended flight but also for transmission a long distance from national

territory. They are totally integrated into manoeuvres and nuclear procedures.

- Specific hardened and secure transmission networks for links with civil national authorities.
- They also cover links with units and aircraft.
- A properly adapted infrastructure for storing and protecting missile and aircraft in complete security.



The future

The airborne component should maintain technical credibility enabling it to adapt to new threats. The new K3 standard of the coming Mirage 2000N will include significant changes to the weapons systems and particularly ECMs. The C-135 will be adapted by the renovation of its navigation system and its instrument panel. Equipping combat planes with tactical data communications will give crews a better appreciation of the air situation, whether it is for strategic air force planes or conventional support systems.

In the medium term, Strategic Air Forces will be provided with Rafale equipped with ASMP-A (A for amélioré improved).

Finally, the deterrent mission and the implementation of nuclear weapons cannot be considered without taking into account two major requirements: respect for government control and nuclear security rules. The first one guarantees the President that firing nuclear weapons is impossible without legitimate orders based on objectives that he has himself approved. The second one contributes to permanently demonstrating our capacities and the credibility of the airborne credibility. Nuclear security is not just a precaution; it is also existential and operational. The strategic air forces regularly show their capacities to the authorities but also to the surrounding world during military build-up operations (BANCO), the overall flight mission (POKER), live firing of medium-range ground to air missiles (TEF) and all other exercises in which the President, Prime Minister, the Ministry of Defence, COFN/COFAS, but also large a number of our conventional means. A leaner command of 2300 people, including more than 2100 operational units, assumes daily its deterrent mission and builds its operational credibility.

Deterrence is therefore a peace maintenance operation, an ongoing operation that has been successful for 36 years.

*General Gérard Saucles, FAS Commander
début*

FROM THE US N 124 "LA FAYETTE" SQUADRON OF 1916 TO THE EC 2/4 "LA FAYETTE" OF TODAY



On this first day of July 2001, the La Fayette 2/4 fighter squadron is celebrating its 85th anniversary. From the squadron of American volunteers in 1916 to the French nuclear deterrent of today, it is a long story.

Trooping the colors at the escadrille " La Fayette" in 1917. The French tricolore flies along with the Old Glory.

In summer of 1914, when France and Great Britain went to war against Kaiser Wilhelm's Germany, a large number of American citizens wanted to join the French army all inspired by the sentimental links between the two countries that dated back to the 1774 war of independence. As the United States were not at war, the only way for American citizens to join the ranks of the French army was through the Foreign Legion. Then they had to volunteer for the aviation units.

One of them was a pilot. His name was William Thaw. He convinced his French commanding officer, Georges Thenault, to create a unit for American pilots. The idea was attractive. On leave to the United States, William Thaw carried out a recruitment campaign with his colleagues Norman Prince and Elliot Cowdin whilst the American Ambulance Field Service did the same in France. Once the Foreign Affairs and War Ministries had been convinced, on 18 April 1916, the "American volunteer" squadrons were created. Taking the name no. 124 La Fayette squadron, it settled in Luxeuil in the Haute Saône region of France and was allocated six Nieuport IX of which quite naturally Commander Thenault took command. On that day, one of the strong symbols of Franco-American friendship was born but also the first fighting air unit in the history of the United States: the Nieuport 124 (or simply N124) La Fayette.



Captain Bob Soubiran of SPA 124 poses in front of a Spad XIII, the American flyers favorite biplane.

The spirit of La Fayette

In addition to Thaw, Prince and Cowdin, the first N124 aviators were Kiffin Rockwell, Chouteau Johnson, Bert Hall, Clyde Balsey, Victor Chapman, Laurence Rumsey and James Mc Connell. In all, it used 38 American pilots. Some of them came from American high society and others came from poor backgrounds. Among them 28 lived through the war and apart from the N124, it should be pointed out that 209 other American aviators served in French squadrons. Their motivations combined Republican idealism, a spirit of adventure and a Francophile sentiment. Paying tribute to the commitment of American citizens, General Gouraud, Commander of the Champagne front, declared in autumn 1914: "when men that nothing obliges to fight decide to risk their life for a cause dear to them and to fight in a foreign uniform an opponents that is not at war with a country, these are real heroes". On 18 May 1916, Kiffin Rockwell marked the first victory of the N124. The next day, the unit joined the front at Verdun. After the Nieuport, the N124 fought with Spad VII (Guynemer's plane) and Spad XIII. Charles Nungesser, the French flying ace with 45 victories, was assigned to the N124. The scope of their missions widened in July 1917 when crews were trained in the dive bombing of 10 kg bombs fixed under the wings of the biplanes.

On 6 April 1917, the United States joined the allies in the war. With the arrival of American troops in France, the heroic era of the first volunteers was over. On 18 February 1918, the SPA 124 La Fayette squadron became the first American fighter squadron of the American Expeditionary Forces under the official name of 103rd Pursuit Squadron, but it kept its mechanics and planes. Raoul Luftbery alone totalled 17 victories and the La Fayette Flying Corps managed 199 official victories.



With US support GC II/5 "La Fayette" is reborn in Algiers in 1943 with USAAF Curtiss P-40 Warhawks.

From the combats of 1939 to "VE-Day"

When peace returned, the unit was reformed in France as the 10th squadron of the 3rd group of the 3rd Regiment of Fighter Command that renewed the traditions of the N124 and, particularly, the famous Sioux head. After the creation of the Air Force, the Sioux squadron formed with the 4th squadron of the Cigognes (SPA167), a new group that would later become the II/5 fighter group.

The second world conflict began in September 1939 and the first French air victory was obtained by the GC II/5 on the 20th of the month. Sgt Legrand shot down a Messerschmitt Bf109 from his Curtiss H75. On 6 November, a patrol of nine aeroplanes protecting a Potez 63 was engaged by 27 Bf 109. The so-called "9 against 27" fight remains legendary. The result was 10 victories, including seven accredited with no losses on the French side. This shows the determination of French pilots, a determination that was stopped by the defeat of June 1940. Once the armistice was signed, the group went to Oran in Algeria and became a component of the Armistice Army. On 7 November 1942, came operation Torch, the landing of British and American troops in North Africa. On 15 November, the II/5 received 25 Curtiss P-40F Warhawk and was integrated into the Mediterranean Allied Coastal Air Force. Favoured by its Franco-American tradition, it was allocated P-47 Thunderbolts in April 1944, the most powerful fighter bomber of the time. After having supported the landing in Provence in August 1944, La Fayette pilots then participated with five other French fighter groups in the support of the 1st Army. The result was between November 1942 and 8 May 1945, the GC La Fayette carried out 7444 sorties, with 25 accredited victories and dropped 1600 tonnes of bombs. The unit nevertheless lost 29 pilots.

Mach 2 and nuclear deterrence

From the armistice of 8 May 1945, the group participated in the occupation of Germany. The 1 July 1947, the II/5 was named II/4 La Fayette fighter group. Recalled by the Indo-China war, the unit left for the Far East. From bases in Gialam and Tan-Son-Nhut, with Spitfire Mk IXs in very difficult logistical and weather conditions, it carried out in support firing missions to French troops engaged against the Viet-Min.

Back in Friedrichsaffen at the end of 1948, the II/4 recovered its P-47D, that were quickly replaced in November 1949 by De Havilland Vampire Mark V. The La Fayette was then a French part of NATO. In 1953, the squadron changed to Dassault Ouragan. Based in Bremgarten in Germany, the 2/4, that used F-84F Thundrestreaks from 1957 was attached to the 1st CATAC, that itself was under the direction of the NATO 4th Allied Tactical Air Force. In 1961, the 4th squadron arrived at its Luxeuil base. While France was leaving NATO's integrated command (but not the Atlantic Alliance) following a decision by General de Gaulle, the II/4 received the first Mirage IIIE fighter bombers on 13 October 1966. They were a technological revolution. Dassault delta-wing aircraft reached Mach 2 and it had the first terrain following radar developed in France and an elementary ECM system. In 1972, the squadron implemented the first French tactical nuclear weapon, the AN 52 bomb. The squadron was chosen to carry out live firing at the Pacific Test Centre in Mururoa. The operation took place on the 27th August 1973 from a Mirage IIIE no. 617, consolidating with this strong gesture the credibility of the budding French nuclear deterrent. In the Europe of the Cold War at the beginning of 1980s, French tactical nuclear units had their deterrent mission redefined according to a concept of "pre-strategic strikes". This meant that in case of conflict, a limited nuclear strike could be delivered to enemy troops as an ultimate warning. This mission was affected by the 2/4 with the arrival of Mirage 2000N, (N for Nuclear) armed with the medium range air-to-ground missiles ASMP. Close behind the 1/4 Dauphiné squadron that was operational on 2000N on 12 July 1988, the 2/4 started its transformation with the new bomber in November and on 1 July 1989, it was operational with its allocation of 20 aircraft. Now, the La Fayette with the EC 1/4 Dauphiné and 3/4 Limousin ensures faultlessly its strategic nuclear mission.

Philippe Wodka-Gallien
début

THE AMERICAN WAR OF INDEPENDENCE : THE CONTRIBUTION OF THE COMINT TO THE BATTLE OF THE CHESAPEAKE



A Franco-American intelligence operation

The naval battle of Chesapeake Capes at the extreme limit of Virginia took place on 5 September 1781. It involved a French fleet led by Admiral de Grasse that was part of Royal forces led by the Marquis de la Fayette and the British colonial fleet led by Admiral Graves. At the time, Paris and the court at the Château de Versailles was highly favourable to the American patriots. The commitment of France to support the American rebels was part of an alliance treaty signed on 6 February 1778 that stipulated that the French government recognised the total independence of the United States of America. The two parties also agreed not to make peace with Great Britain before the independence of the thirteen colonies had been recognised.

The naval battle of the Chesapeake was decisive in the United States' progress to independence. The legend holds that Admiral de Grasse was victorious due to the visual interception of the British fleet's signals: signals that the French sailors succeeded in decoding with a secret signals code. The codebook was allegedly stolen in New York by one of George Washington's espionage agents, Captain McLane, who sent it to the French allies. The orders given by Admiral Graves to his nineteen ship fleet were first to maintain the line flying the corresponding white flag, then when the French ships got close enough for the guns, to break the line flying another flag. The legend also says that reading these flags helped Admiral de Grasse interpret the enemies' battle orders; another theory is that orders were confused, transmitted to the British fleet captains following a mistake by the Admiral's ship sailors who hoisted several contradictory flags at the same time.

Five days later, the defeated British fleet left the Chesapeake Bay and abandoned General Cornwallis' ground forces to their ultimate fate before God... With the defeat of the British troops at the battle of Yorktown in October came the glow of a new independance, the stars and stripes floating freely at last over the Land of the free".

IGA Geoffrey d'Aumale

Member of the board of directors of Guerrelec La Fayette AOC Chapter.

For further information :

The Chesapeake Capes : American intelligence coup ? by G. J. A. O'Toole

THE "LA FAYETTE" AND THE MIRAGE 2000N

10 November 1988 saw the last flight of a Mirage IIIE in "La Fayette" colours, thus bringing to an end 22 years of operational service for the famous delta-wing fighter as part of this illustrious squadron.



The transition to the new aircraft then began, and with it, a new chapter in the history of 2/4 fighter squadron, "La Fayette"... Compared with its predecessor, the Mirage 2000 N is a radical departure, incorporating an inertial guidance system, terrain following radar and the presence of an on-board navigator, which has brought the novel concept of a crew to the squadron. The advance in terms of armament is quite considerable: the aircraft is no longer armed with a single bomb, but a supersonic missile that can be fired from a safe distance. It is this Mirage 2000 N/ASMP missile package that became operational with the squadron on 1 July 1989.

The Armée de l'Air reorganisation of 1 September 1991 saw the 4th Fighter Wing attached to the strategic air force command and a third squadron, SPA 160, joining the unit. In July 1986, this squadron was created at Colmar out of the former 21/13 fighter squadron, "Artois", flying Mirage III Bs. It was mothballed in 1989 before being officially disbanded in 1991, when the unit transferred to the Mirage F1CT. A few months later, it was reborn at Luxeuil alongside the "Sioux" and "Canard" squadrons.

In the Balkans

In July 1992, "La Fayette" crews took part in the Red Flag exercises at Nellis Air Force Base in the US. On 1 September 1993, the 4th fighter squadron command was disbanded as part of the new Armée de l'Air organisation, leaving 2/4 as an autonomous unit.

The allied intervention in the former Yugoslavia required the detachment of unit personnel to Vicenza for planning and to Bosnia for duty as advance controllers, with mechanics being sent to Sarajevo. It was in this context that 2/4 squadron, "La Fayette", provided a detachment of Mirage 2000 N aircraft to Cervia for reconnaissance flights over Bosnia in November 1994. On 21 November, NATO and the UN decided to launch a reprisal raid in response to Serbian provocation: two Mirages were amongst the strike force of 30 allied aircraft in this successful mission.

The year 1995 began with the participation of one La Fayette aircraft, 5 crews and a team of mechanics in the Red Flag exercises, with missions being flown day and night. Closer to home, seven crews departed for Cervia as part of Operation Crécerelle, flying many reconnaissance missions over Bosnia between April and June. A new two-month detachment began on 26 December.

The Mirage 2000 N takes over from the Mirage IVP

By 1996, the Mirage IVP was beginning to show its age and the decision was taken to transfer our strategic nuclear capability to the Mirage 2000 N. On 18 January, 2/4 Squadron began the Poker build-up simulation exercises. By 1 July, the squadron was fully operational in its new role.

Nuclear warfare exercises then followed throughout 1997. Operations Banco, Poker and Palmier were the daily fare for personnel who were able to demonstrate their skills and make their contribution to Nuclear deterrence.



A MIRAGE 2000N of the "La Fayette" Squadron equipped with an ASMP nuclear missile

1998 was another good year for 2/4. In May, Lieutenant-Colonel Lipka, Captains Jobic and Martin and Sub-Lieutenant de Dinechin won the Comet Cup. In July, our crews took part in the Cooperative Key exercises in Turkey, and SPA 167 Squadron celebrated its 80th anniversary in September. Although the aircraft of 2/4 did not play a part in operations over Kosovo, our personnel were, nevertheless, involved in the allied staff headquarters. The Monfreid exercises (escort duties to Djibouti) began in September. The violent storms of 26 December 1999 did not spare the squadron's base and personnel were all on station on Boxing Day to begin repairing the damage. In addition to nuclear warfare exercises, the Year 2000 also saw high levels of conventional activity. A Monfreid exercise began in April, followed by the ODAX exercise, during which we welcomed a detachment of Turkish F-16s. NATO's Air Meet exercise took part of the La Fayette squadron to Denmark in September.

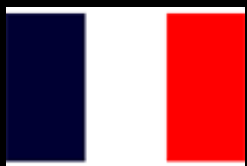
In 2001, a deployment at Eielson AFB in Alaska as part of the Cope Thunder exercise confirmed that today, as in 1916, 2/4 fighter squadron, "La Fayette", is always ready to take on any mission entrusted to it. This ability was rewarded in May by winning the Coupe Tactique and coming second in the Coupe Cornète.

In all the years that separate the Nieuport XI from the Mirage 2000 N, the unit has never ceased to move forward and has never lost its original identity, and therein lies the paradox of this arbitrary collection of totally different personalities, linked only by their comradeship. The truth is that regardless of the machines it flies, a squadron is not a collection of talented individuals, it is a team united by a single purpose. Everyone must know their own place in the organisation and all must contribute to the communal effort. And when the vagaries of change take us away from the unit, the mirage evaporates to be replaced by an unyielding emotional link: the well-earned and living pride of being part of "La Fayette".



*Lieutenant Colonel Bruno Duvert, Commanding Officer,
2/4 La Fayette fighter squadron
début*

THE 2/4 "LA FAYETTE" AND THE USAF SISTER SQUADRON CHIEFS



August 1914. France and Germany are at war. On the other side of the Atlantic, young people decided to go to France to fight in its army. They joined the ranks of the Foreign Legion or served as ambulance men. After a few months, they managed to join the air services. They wanted to come together in an American squadron. In April 1916, N124 carried out its first missions. Soon after, the Sioux head appeared on the fuselages, although its final shape would not be fixed until after the war.

August 1940. France was beaten and Great Britain found herself alone against Germany. The RAF was cruelly short of pilots. Then, 26 years after their predecessors, some Americans arrived, even though their country was not at war. They were rapidly organised into three squadrons, baptised Eagle squadrons, in honour of the United States' emblem. One of them, Squadron 121, chose an Indian chiefs' head to decorate the fuselages of its planes. In 1942, it became the 335th Fighter Squadron of the USAFF.

Thirty years later, Mirage IIIE of the 2/4 La Fayette still carry the Sioux head. Their dual mission is to ensure the tactical nuclear warning and carry out conventional assault missions. On the other bank, 6000 kilometres away, F-4E Phantom of the 335th TFS carry out identical missions to the French fighter bombers. It was therefore quite natural to twin the two squadrons. In June 1976, for its 60th birthday, the 2/4 Fighter Squadron saw its Mirage IIIE with American Phantoms from its sister squadron on the tarmac of BA 1 16 at Luxeuil.



A MIRAGE 2000 N of the EC 2/4 "La Fayette", flying back from "Red flag" manoeuvres in the US. The aircraft is refueled by a French Strategic Air Forces C-135FR Stratotanker

Then, from 1987, the commissioning of the Mirage 2000N air-to-air refuellable fighter bomber within the Strategic Air Force gave the French planes the opportunity of crossing the Atlantic. In July 1996, of the 80th anniversary of the La Fayette, two Mirage 2000N were to be found in North Carolina sky accompanied by a C-135 FR refuelling aircraft from the Strategic Air Force, F-15E from the Air Combat Command, the new version of the 335th FS. Its common missions allow crews to compare their methods, so proving that traditions remain lively on both sides of the Atlantic.

Captain Jean-Yves Cassier - E.C 2/4 La Fayette

début

MIRAGE 2000N : WEAPONS, FEATURES AND PERFORMANCES

Manufacturer: Dassault Aviation
First flight: 3 February 1983
Crew: 2
Length: 14.55 m
Wing span: 9.13 m
Weight empty: 7.6 t
Max T.O. weight: 17 t
Max continuous speed: Mach 1.4
Max speed (SL): Mach 1.2
Max speed at 200 ft: 600 kt
Power plant: one Snecma M-53P2
Max external stores: 6.3 t



Weapons: nuclear cruise missile ASMP, 250 kg bomb, anti-runways bombs BAP100, tactical bombs BAT 120, antipersonnel submunition bombs Belouga, 68 mm rockets, two air-to-air IR Magic II missiles.

Navigation and attack system: Antilope V terrain-following radar (Thales) and inertial platform (Sagem).

Integrated self protection system: Camelion jammer, radar warning receiver Serval (Thales), decoy launchers Spirale, Eclair and, in delivery, IR Missile Detector (MBDA).

Sources : Jane's All the World Aircraft.

début

THE MIRAGE 2000 N SELF-PROTECTION SYSTEMS : CURRENT AND FUTURE

First brought into service in July 1988 in a version dedicated to fulfilling a nuclear capability role, the Mirage 2000 N has appeared in several other versions designed to extend its operation in the conventional arena.

It is within this simultaneously nuclear and conventional warfare context that the vital development of Mirage 2000 N self-protection systems (SPS) is taking place. Given the changing nature of the threats involved and the ways in which they are used, defining the self-protection system of the future must not only take advantage of continual advances in technology, but also be based on ever-closer integration with the navigation/attack system (NAS). Having described the component parts of today's EW-SPS and its very short-term modifications, we will go on to outline the possible development paths between now and 2007/2008.



From stage one : the current EW-SPS

Commenced in 1978, the Mirage 2000 N programme has enabled the development and design of counter-measures suited to the missions assigned to the aircraft, chiefly those concerned with low-level penetration.

The radar detection/jamming function is provided by the same SERVAL /CAMELEON combination used in the Mirage 2000 D fleet.

SERVAL detects threats in the vicinity, presenting the pilot with all the necessary information using a display called a counter-measures display. The system comprises an omnidirectional antenna in the nose of the aircraft, a rear antenna on the top of the fin, two wing-tip antennas and several processing units.

CAMELEON is an omnidirectional self-protection jammer dealing automatically with ground-to-air and air-to-air threats.

The SPIRALE decoy system is integral to the NAS and works in automatic, manual or "counter" mode, which enables chaff to be released on demand at the push of a button.

SPIRALE is comprised chiefly of a cartridge dispenser carried below the aircraft and internal wing-mounted chaff launchers.

Compatibility is managed by a special (C3M) unit, which controls the co-existence of the various components and their relationship to the rest of the NAS. This item of equipment helps integrate the SPS into the wider armaments system. Such integration is the subject of very close attention, with the aim of providing pilots with an accurate view of the tactical situation and with reassurance that the right jamming or chaff treatment is being deployed.

The K2-4c standard

Scheduled to enter service in 2002, this new counter-measures configuration is a step towards a more extensive revision of the SPS.

Firstly, it enables improved electronic warfare parameter restoration, whilst integrating aircraft attitude data in order to improve SITAC knowledge and optimise programming.

Secondly, the decoy function is also being modified, most notably by the addition of the ECLAIR chaff release system. Part of SPIRALE, this new system significantly increases the aircraft's flare carrying capacity.

Finally, the NAS now incorporates an infrared detection function via a Missile Launch Detection System (MLDS) fitted to the 2255 missile launcher.

Developed and designed during the cold war for low altitude missions, the SPS must now be developed to meet the new operating requirements of theatres that are as varied as they are unpredictable. In addition to the developments described above, a much larger revision is required to provide optimum crew protection based not only on technical modifications to equipment, but also on a much greater degree of integration.

... to a more complete modernisation

As part of its mid-life retrofit in 2007/2008, the Mirage 2000 N will advance to a new standard, now being defined. Without speculating on the precise form the future Mirage 2000 N SPS might actually take, we can nevertheless sketch out the major directions of this modernisation, already referred to elsewhere in a previous GUERRELEC newsletter.

The following lines should therefore be considered not as a description of the future Mirage SPS, but only as potential improvements that may or may not be made. They also apply to the entire Mirage 2000 family.

Firstly, this upgrade will be concerned with additional capacity or significant increases in existing capacity.

The detection function must take account of the key problems highlighted in recent conflicts (Bosnia, Kosovo, etc.) and therefore provide the capability to handle dense environments and detect the difference between false alarms and real threats.



There can be no doubt that the emergence of digital technology in the field of electronic warfare receivers will contain a potential response to this need.

The jamming function must incorporate techniques that accommodate increasingly sophisticated Electronic Counter-Counter Measures (ECCM) against ground-to-air or air-to-air threats, whilst providing satisfactory Self-Protection Distances (SPD) at all altitudes. The potential responses to this generic need must be based partly on Digital Radio Frequency Memory (DRFM), which saves and re-transmits the signal received in a variety of forms, and partly on increased jamming system coverage and power.

Finally, an angular jamming capacity would be desirable, perhaps by using the kind of towed decoy that was so well commented upon during the MACE X NATO trials of August 2000.

Already included within the K2-4c standard, infrared detection should be integrated even further.

Finally, an extension of the decoy capacity may be envisaged, perhaps by reusing the dorsal spine cartridge launcher modules fitted to the Mirage 2000 D.

Secondly, system integration must be improved.



Designing or modernising a complex armament system means that even the earliest stages of the programme must take account of integration constraints, the requirement to merge data from the various sensors and the need to ensure maximum cohabitation between the various items of equipment through optimised functional compatibility. In short, it means delivering the user-friendliness, flexibility and ease of use the crew requires and which are essential objectives for the officers and managers directing the programme.

As applied to the SPS of the Mirage 2000 in general, and the 2000 N in particular, this means increased cooperation within the counter-measures system itself and between the SPS and the NAS, with the aim of giving the crew the best possible perception of the tactical situation and the highest degree of protection.

An SPS architecture must be devised that will address the imperatives of sub-system inter-operability. It must combine modularity with speed of communication and the ability to run in degraded modes. This applies as much to the radar detection and jamming functions as to those of decoy and infrared detection. The merging of data and the implementation of an action decision unit in this respect would inevitably strengthen the whole system.

If perception of situations can be substantially improved by modernising the SPS, then the attention given to the NAS should be focussed on multi-sensor logic systems capable of exploiting data from a variety of origins, which could in turn resolve potential ambiguities of identification.

However, the solution to optimising the operation of these systems lies mainly in managing compatibility. An

operational logic system, which must be defined at the design stage (e.g. the relative priorities of the radar and jamming systems according to system mode), would have to be reflected in hardware and software modifications during the development phase. This imperative to study compatibility issues at the earliest stages of a programme or retrofit does not, of course, overcome every difficulty since physical constraints will sometimes impose limits. At the very least though, it would enable priorities to be defined and all the latest (digital, frequency, etc.) technologies at our disposal to be employed in finding acceptable operational compromises. It is with this objective of reconciling self-protection functions with system constraints that the future Mirage 2000 N SPS must be designed.

Commandant Pierre Goudal
BSA / French Air Force HQ
début

NATO'S COMING ELECTRONIC WARFARE TRIALS

For NATO, electronic warfare tests are already programmed for the coming two years. Therefore, in 2002, EMBOW 9 electronic warfare tests on infrared decoys will be organised in France at the Landes test centre, south of bordeaux. The meeting of several NATO forces will be an opportunity to use a new generation of decoys. It is also important to note that EMBOW 9 will welcome for the first time helicopters from the Army (ALAT) and the French Air Force. 2003 will see MACE 11 tests devoted to electromagnetic counter measures. They will be carried out in the United States at the Biggs Army Airfield in Texas. For these tests, the opponent will be radars supplied by the Americans that will be essentially replicas of ex-Soviet systems still little-known in Europe.

Pierre Roudaut
début

GENERAL LA FAYETTE'S FRIGATE IS REBUILT

In 1779, construction of the frigate "Hermione" started at the Rochefort royal shipyards, near Bordeaux in the Kingdom of France. A few months later, the Marquis Marie-Joseph Paul de La Fayette boarded the newly launched ship to sail for America and fight along the US patriots in their war for independence. A large 65 meter-long three-masted ship, "Hermione" was armed with twenty 12-pound canons and six 6-pound guns laid on the forecastles.

In 1997, a new adventure began when the Association Hermione-La Fayette, which musters 4,000 members decided to rebuild the ship as a symbol of long-lasting Franco-American friendship. The keel was laid down on July 14th, 1997 - the US Independence Day - precisely the year the La Fayette French Chapter of the AOC was created. Current plans call for "Hermione" to return boldly in 2007 to Boston harbour in General La Fayette's own footsteps. The La Fayette French Chapter of the AOC is today among the sponsors of this historical enterprise.

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