

ENGAGE!

MIRAGE 2000

around the world



Squadron chat

Trophies and diplomas awarded in the UAE...

Trophies and diplomas were awarded on January 19, 2005 in the United Arab Emirates to 46 UAE AF&AD pilots (1,000 FH patch and diploma), 2 UAE AF&AD pilots (2,000 FH patch and diploma), 3 FAF instructor pilots (1,000 FH patch and diploma) and to Dassault Aviation former display pilot Laurent Fournier (3,000 FH patch and diploma).



"Mirage 2000" added to MINI DOCAVIA book series

Hervé Beaumont has just published MINI DOCAVIA issues 19 and 20 featuring the Mirage 2000 and other Dassault fighter aircraft. All versions of the Mirage 2000 are covered with a full set of data.



Indian AF receives more Mirage 2000H/THs



The first six Mirage 2000H/THs out of a follow-on order for 10 have been formally accepted by the Indian Air Force in Mérignac on December 29, 2004. They were immediately ferried to IAF Gwalior and landed there on January 4, 2005.



...and in Egypt

Seven Egyptian AF pilots were also awarded the 1,000 FH patch and diploma on November 28, 2004 during a ceremony at Berigate airbase in Egypt.



FAF 1/3 "Navarre" Fighter Sqn celebrates...

FAF 1/3 "Navarre" Fighter Squadron held a double celebration on June 24, 2005 at FAF Nancy-Ochey with the 90th anniversary of "Escadrille SPA 62", together with 50,000 flight hours by 1/3 "Navarre" Fighter Squadron on the Mirage 2000D.



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About our cover:

UAE AF & AD Mirage 2000-9's in the UAE sky
Photos K. Tokunaga

About our posters:

R° : Three UAE Mirage 2000-9's over flying UAE landscape
V° : Hard turn during a Mirage 2000-9 presentation
Photos K. Tokunaga

Photo credits

Photos by French Air Force, SIRPA-Air, K. Tokunaga, F. Robineau, Thales, Snecma and Dassault Aviation.

ENGAGE!

5 . 2005

Editorial

Here is the 5th issue of "ENGAGE!", mostly dedicated to the UAE Air Force and Air Defense and their new Mirage 2000-9s.

You will find a feature article about the Air Warfare Center located at Al Dhafra Air Force Base, Abu Dhabi, United Arab Emirates. It is the very first Tactical Center in the Middle East to perform Tactical Leadership Programs (TLP), training pilots in complex and realistic tactical situations and developing leadership skills.

Enjoy!

The "ENGAGE!" Team

MIRAGE 2000
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The UAE AF & AD Air Warfare Center



General presentation of the Air Warfare Center

A first in the Middle East

The UAE Air Warfare Center was the very first tactical center to be set up in the Middle East. It has been created and developed by the United Arab Emirates Air Force to conceive and to operationally evaluate its own tactics in the wake of the Mirage 2000-9 and F-16 Block60 procurement. The Mirage 2000-9 is an extremely capable multi-role fighter aircraft, designed and developed to UAE Air Force requirements with specific capabilities in terms of air-to-surface guided armament, data link and electronic warfare. The purpose of the Al Dhafra AWC is similar to the other two existing tactical centers, i.e. "Red Flag" in Nellis (USA) and "TLP" (Tactical Leadership Program) in Florennes (Belgium). The main objectives are to raise the interoperability and the combat effectiveness of the participating air forces by developing pilot leadership skills. This is achieved by commanding, planning and executing demanding air exercises using realistic scenarios within a tactical training environment.

The value of meeting, flying and fighting

The first AWC course took place in January 2004 with three participating nations. The AWC has just run the 4th course in April 2005, involving air forces of the UAE, the US, the UK, Qatar, France and Saudi Arabia. The UAE AF&AD flew with or against F-15Es, F-15Ss, Mirage 2000-5s and Tornados.

All participating aircraft were fitted with an ACMI (Air Combat Manoeuvre Instrumentation) pod which provided the flight parameters necessary for real time or post mission tactical debriefing. This would develop into tactics discussions and exchanges with experienced pilots organised by AWC staff.

As an experienced fighter pilot myself, I can certify the value of meeting, flying and fighting in such an environment!

Lt Col Dominique Perrier (French Air Force)



French Air Force dispatches Mirage 2000-5s to Al Dhafra

FAF Flight Leader Cpt Verreckt reports from Al Dhafra, UAE:

Six FAF Mirage 2000-5s landed at Al Dhafra air base in the United Arab Emirates in the morning of 30 March 2005, marking the start point of the second deployment of the French Air Force to the UAE Air Warfare Center (AWC).

The 65-men detachment from FAF 2/2 Fighter Sqn. "Côte d'Or" included 16 fighter pilots who were to take part in the month-long "AWC 2005-1" exercise. AWC 2005-1 was the 2005 edition of the yearly training event staged by the Al Dhafra AWC, the first center of excellence in air warfare to be established in the region by the UAE AF&AD in 2000. The purpose of the exercise was to train package commanders in COMAO operations in a multinational setting, in a fashion similar to NATO TLP (Tactical Leadership Program) sessions.

The Al Dhafra Air Warfare Center has specific features which set it apart from other ranges in the US or in Europe. First of all, several launches

are programmed every day, allowing more pilots to train with or against foreign aircraft in a given time frame. Airspace available here for training is three times the size of the Red Flag zone at Nellis, with minimal manoeuvre and EW restrictions. Combat tactics that would otherwise be hampered by the narrow airspace available on most other ranges or by peacetime restrictions can be run to their full potential. The Al Dhafra AWC also features a latest generation range instrumentation and debriefing assets which allow precision real-time flight monitoring - an essential flight safety feature - and accurate scoring validation.

Air forces taking part in AWC sessions include all GCC (Gulf Cooperation Council) countries, plus France, Britain and the US - an excellent opportunity to practice interoperability in the perspective of forthcoming coalition operations.

Lessons learned on the French side have been extremely positive. The dispatch rate of the Mirage 2000-5 has been excellent throughout the exercise, at an average of 16 sorties a day. A

variety of missions have been flown from DBFM (Dissimilar Basic Fighter Manoeuvre) to 30-strong flights in a wide range of scenarios. The UAE AF&AD have really been out of their way to give us the most cordial welcome. Warm relations have been established among the participants and we are now leaving the UAE with the feeling that the strong relationship that we have built during AWC 2005-1 will make future sessions even more profitable. The AWC staff have done a great job and they deserve recognition for their efforts to establish the Al Dhafra Air Warfare Center to the highest possible standard in the world.



The UAE AF & AD Air Warfare Center

Interview of
Lt Col Khaled Omar
Saleh Ba Hussein,
*Commander of the
Air Warfare Center.*

In one year, the AWC
has run 3 successful
courses, what are the
main objectives of the Air
Warfare Center?

The main objectives of the AWC are:

- improve tactical capabilities
- develop tactics, techniques and procedures
- improve air combat doctrine
- improve interoperability among coalition air forces

One of the ways of carrying out these objectives is by running the Advanced Tactical Leadership Course (ATLC). This course brings together coalition air forces for 4 weeks of tactical flying, where the AWC staff concentrate on tactical leadership training. On the ATLC, air leadership is taught through a series of realistic tactical scenarios where aircrew from each nation is given the opportunity to lead a combined air operations (COMAO) "package" in order to carry out tactical air objectives. Modern warfare demands high quality training and no expense has been spared to give all the students the most modern and up to date facilities that are necessary to carry out their tasks. The ATLC is not just a test of aircrew skill. It allows students from coalition nations to get to know each others background and cultures, so that deep friendships and understanding are achieved. In future coalition warfare, interoperability will be a key success factor in combined and joint operations and the AWC – by fostering this important objective – will be carrying out a major part in creating successful battle outcomes.

What are the different participants and how do you manage the organization?

Different participants are invited to attend the AWC's ATLC. In the first 2 courses, participants were kept to just the UAE AFAD, United States Air Force (USAF) and the UK's Royal Air Force (RAF) to validate our tactical leadership concepts. The 3rd course consisted of the UAE AFAD, French Air Force (FAF), USAF, RAF and Qatar. On the recent 4th course, participants included UAE AFAD, FAF,

RAF, USAF and Royal Saudi Air Force (RSAF). However, we are now expanding our invitations to include other GCC and friendly states. In the near future, we hope to include Italy and Germany on our ATLC programme.

Management of the AWC is shared. The Commandant of the AWC is a UAE instructor pilot (IP), who has overall control of the AWC. He has command of a number of branches below him that make up the management team of the AWC. The Deputy Comdt is a USAF Lt. Col IP who acts as Head of Flying Branch. Other management appointments, all at Lt Col level, include a Head

of Academics, Head of Concepts and Doctrine, Head of Simulation and Head of Command & Control. These are rotational posts that can be held by any IP from a participating nation for a nominated period of time. The ATLC is primarily a Flying Branch run activity, overseen by the Comdt, but where all other branches support the flying activities within their own specializations. All AWC staff are highly experienced in their fields and use their own specialist expertise to create an effective management team.

What are the advantages of the AWC compared to existing equivalent tactical centers?

The AWC is very similar in philosophy and outlook to other air force tactical centres, like the USAF Red Flag organization in Nellis, USA and the NATO Tactical Leadership Programme (TLP) in Florennes, Europe. All of these centres offer certain advantages over others. The advantages of the AWC-run exercises, of which ATLC is one, are many. The main advantages are the airspace, range facilities and good weather. The airspace offered to ATLC students is larger in area and volume than any other in the world and much less restricted in terms of other users, such as civil air traffic. The range area offered by UAE airspace is twice the size of Nellis and very unrestricted compared to the congested airspace of Europe offered by TLP. In addition, the AWC offers a fully automated ACMI range (Air Combat Manoeuvring Instrumentation) where aircraft can be tracked real-time and "kill removed" (a methodology of removing an aircraft from the COMAO that is judged to be "shot down") by Range Training Officers (RTO's) who act as exercise referees. This ACMI facility, combined with the large unrestricted airspace, offers very realistic training that is not equaled anywhere in the world. Finally, the weather is good enough that hardly any missions are cancelled. To date, only one mission in 4 courses has been cancelled due to bad weather. Compare this with TLP in Europe where it is not unusual to have up to 50% of missions cancelled due to weather restrictions.

What are the AWC challenges for the future?

Although the AWC ATLC courses have been more successful than anyone ever imagined, there is always room for improvement in every aspect of air warfare training and the ATLC is no exception. All the AWC facilities are constantly being upgraded but the main challenge will be to create the most appropriate tactical scenarios for the future air war, not the ones that replicate the past. If future air leaders are to be effective, they must be given tactical problems that require innovative and imaginative solutions to overcome them. There are many ways of doing this. An example is to develop realistic tactical scenarios that include Time Sensitive Targeting (TST), where priority enemy targets "pop up" unexpectedly but have to be dealt with very quickly and with the most appropriate weapons available. Another

example is to have scenarios that apply offensive airpower to ground operations. Future airpower will have to respond quickly to fast moving, joint force activities where ground and maritime forces will require the full weight and advantage of air power in order to carry out their battle plans. The future of warfare is "jointness", and air forces must be ready to respond to the difficult and exacting challenges that joint warfare has to offer. Integration with other armed forces is essential. This trend will need large investment, intellectually and financially, by all air forces; but the AWC is willing to respond and the UAE AFAD has never failed to invest in good facilities. The outlook for improving ATLC training into a first-class international global facility is, therefore, extremely good.



Flight safety corner



Mixed safety for mixed bunch training ?

Flying with other aircraft types is always thrilling. To name a few of such opportunities, Dissimilar Aircraft Combat Training, Tactical Leadership program, multi nation exercise, squadron exchanges... This is THE occasion to compare with the other guys and their machines in each training aspect: flying with them or fighting against them! The truth is it indeed exiting and exhilarating, everybody will try his best to give the best image of his squadron/aircraft type/country.

There are however several traps in such "mixed bunch Ops".

Even if the "Domestics" of the briefing suppose that problems are dealt with by pair of same a/c, prepare yourself to be able to lead back a sick bird of the other kind!

Speak with the other jockeys, ask them what are the particularities of their a/c and among other things:

- General consequences of main failures, (hydraulics, electric, fuel, oxygen/pressurization)
- Main engine failures, back up regulation characteristics,
- Max range/Max Endurance Mach or airspeed,
- Handling checks,

- Usual or particular airspeed values for U/C extension,
- Straight in approach parameters or key points (eventually, same for No Flaps),
- Hook or drag chute use,
- A/c and engine limitations,
- Review of emergency radio calls,
- NORDO procedures and associated hand signals convention.

Briefs as thoroughly as possible what would be the overall recovery plan, take time to have a quick cockpit layout presentation of each a/c to have a better understanding of the environment of every one.

Once airborne don't push it too far, for them as well as for yourself. If you have to face an emergency, there is no magic recipe: good common sense and a/c knowledge should prevail and keep you out of trouble, but you have to think and talk about it together before flying.

And remember, this is to train together, to come out of it stronger and more efficient, not to answer an Investigation Board...

G. Dailloux (Dassault Aviation Flight Safety V.P.)

Top level technology for unparalleled operational performance

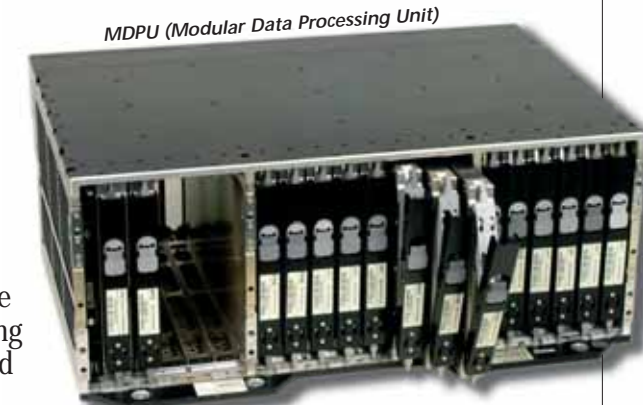


In April 2003, the first Mirage 2000-9 aircraft arrived in Abu Dhabi base, near Bordeaux in southwest France. The arrival of these aircraft, with their latest-generation electronic equipment and systems for both flight control and mission functions, marked the start of a new era in combat aviation for the United Arab Emirates Air Force & Air Defence (AF&AD).

The onboard equipment and the navigation and attack system was defined in close collaboration with the UAE teams, who were integrated with the development teams of the French contractors, particularly Thales, Dassault Aviation and Snecma.

The result of this partnership is an aircraft perfectly tailored to the customer's specific operational requirements. At the core of the navigation and attack system is the Modular Data Processing Unit (MDPU). Developed by Thales and Dassault Aviation, the MDPU performs mission computer and symbol generation functions and manages the navigation and attack system, the cockpit display

system and all other operational functions. Millions of lines of software code were developed for the unit, which authorises multiple reconfigurations and simultaneous implementation of various navigation and attack



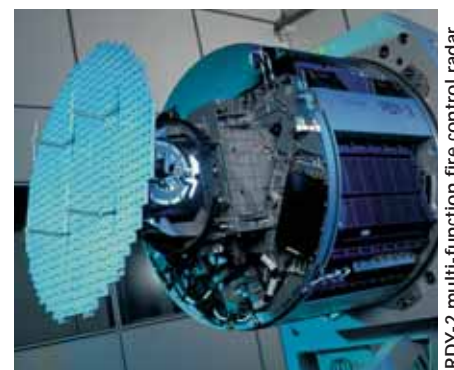
system functions, giving the pilot perfect control over the entire system. To date, the MDPU has logged more than 8,500 flight hours on the Mirage 2000-9.



Top level technology for unparalleled operational performance



A key component of the aircraft's navigation and attack system, the RDY-2 multi-function fire control radar is derived from Thales' RDY radar, which has demonstrated its operational superiority on French Mirage 2000-5s. Offering further enhancements in air-to-air, air-to-ground and air-to-surface modes, the RDY-2 can simultaneously detect and track multiple targets, making a decisive contribution to the aircraft's combat effectiveness. The Mirage 2000-9's electronic warfare system is entirely unique, developed on the basis of detailed requirements expressed by the AF&AD working in close collaboration with Thales, Elettronica and MBDA. The electronic warfare system contribute to aircraft self-protection, incorporating highly sensitive equipment to perform jamming and deception functions.



RDY-2 multi-function fire control radar

It also contributes to tactical situation awareness, locating threats with high precision and gathering information about them. The system is fully integrated with aircraft systems, including the human-machine interface, which was also defined collaboratively with the AF&AD. And high-level electromagnetic integration enables the aircraft's sensors to operate simultaneously, even during active self-protection sequences.

The customer also required extremely high levels of performance from the aircraft's optronic equipment: the Mirage 2000-9 is equipped with the Shehab laser designation pod and the Nahar navigation FLIR. The Shehab pod enables deployment of all types of precision-guided weapons, either alone or as part of collaborative engagements, at any time of day or night and in the harshest weather conditions. With its very high-resolution camera,



this pod can identify all types of targets well beyond the range of enemy precision-guided weapons, further enhancing aircraft security and survivability. The Nahar navigation FLIR is housed in the pylon that attaches the Shehab pod to the aircraft and can be used with or without the pod installed. Incorporating a high-resolution camera, Nahar is designed for use in all atmospheric conditions, particularly hot and humid climates. It provides a high-resolution infrared image of the area forward of the aircraft. This image is projected onto the pilot's head-up display or another cockpit display to support the pilot during all mission phases, including takeoff and landing, flight, low-level navigation and strikes on ground or surface targets. The Emirate's Mirage aircraft



incorporate the latest generations of communication, navigation, identification (CNI) equipment from Thales.

The Thomrad V/UHF radio system provides secure voice and data communications between aircraft, C2 centres and any other platforms equipped with Thomrad radios via the ground/air communication system supplied by Thales. The LU2 tactical datalink enables operations centres to provide tactical situation awareness, command and control, electronic warfare and other services. For radionavigation, the Mirage 2000-9 is equipped with the AHV-9 radio altimeter, Tacan NC 12B transceiver and TLS 2020 VOR/ILS receiver. Lastly, the SC10D transponder and TSA 2535 interrogator provide the vital IFF function. For flight control, the aircraft incorporates sophisticated equipment and systems that contribute to mission success by relieving the pilot of many of the purely flight-oriented safety and security constraints.

The Mirage 2000-9's ergonomic and attractive human-machine interface makes it a very pleasant aircraft to fly. The glass cockpit features Thales' liquid crystal display systems, which make it quick and easy to read flight- and mission-critical information. Thales is supplying the navigation systems, including the Totem 3000 inertial navigation system, as well as autopilot systems, instrumentation and various types of measurement equipment. It is also involved in electrical power generation for the aircraft and is supplying the DDVR (Digital Data and Video Recorder) for post-mission analysis, the Microspees fatigue recorder and the ESPAR NG flight recorder. Status today: The new aircraft have been delivered, and retrofitting of existing aircraft is continuing apace (almost half of these have already been upgraded). To date, more than 9,000 operational flight hours have been logged with the first standard. Qualification of the second standard, to provide the full range of operational capabilities required, is in progress.



A new control system for the M53-P2

Two of the latest multirole fighters from Dassault, the Mirage 2000-5 and the Mirage 2000-9, are powered by the Snecma M53-P2.

This engine is a proven performer, with various versions logging over one million flight-hours on all aircraft in the Mirage 2000 family. The M53-P2 delivers up to 21,500 lb of thrust with afterburner, and its digital control system means exceptionally carefree handling, plus a very large flight envelope. It has already taken part in a number of missions, where it was able to show its operational performance capabilities, coupled with high dispatch reliability and low maintenance cost. Some 639 M53-P2 engines are currently in service.

The M53-P2 undergoes continuous improvements as well, with the most recent concerning its control system. Three significant modifications were made, concerning the automatic management of nozzle pump failure; the autothrottle (which provides automatic control of engine speed to maintain the speed chosen by the pilot); and the integrated life potential computer, now included in the FADEC (full authority digital engine control).

All M53-P2 engines manufactured in the last four years incorporate these modifications, and they can be activated or not, depending on the customer.

The latest engines built by Snecma were intended for the Mirage 2000-5 (10 for

India and 15 for Greece) and the Mirage 2000-9 (32 for the United Arab Emirates). Only the UAE requested activation of the autothrottle, while the integrated life potential computer will be integrated in the Mirage 2000-5s being delivered to the Greek air force. All three countries will be making use of the nozzle pump failure management function.

The life potential computer, previously located with the aircraft's other computers, is now integrated on the engine itself, in the FADEC. Used to calculate wear to engine parts, this unit acquires data in flight, for subsequent storage.

This change was made following modifications by Dassault Aviation to the Mirage 2000 navigation/attack system: the computers located along the aircraft's "backbone", including the life potential computer, have been replaced by a single computer based on electronic boards. Following this modification, Snecma also changed the location of its life potential computer by integrating it in the FADEC.

This changeover offers several benefits, including simplified data management and maintenance, as well as simplifying the aircraft's wiring and overall complexity.





Would you kindly accept my request for subscription to your mailing list for the Mirage 2000 publication "ENGAGE!"

G.G. Divecha, India.

First of all, I would like to give you the thanks for the detail that you had have with myself, sending me the 3 Engage issues, there are wonderful including the DVDS, which I like very much.

I want to receive the next issues that you are going to publish, for the rest of my life, because for me Mirage 2000 Aircrafts are the best in the world.

Also I would like to know if its possible for yourself, to send me all the information about Mirage 2000, like photos, videos of training and combats missions, acrobaces, etc.

Also I would like to have posters, the Squadrons patches, because I also like to collect that kind of Items.

I would like have the Best of Mirage 2000, because I repeat you, for myself Mirage 2000 is the best.

J.C.M. Belgrano, Peru.

I am writing from Peru to tell you that I am a big aviation enthusiast. I am a big fan, especially of Mirage 2000, so much so that I recently bought a Mirage 2000 cap from the Dassault store on the Internet. I just received the cap through my sister who lives in Madrid, it is quite spectacular. What I would like to know is how I can acquire some DVD's on the French Air Force Mirages as well as Peruvian Mirages. Also, I would like to know if any patches with the Dassault logo exist and how do I go about to get it.

G.L. Montoya, Peru.

■ *ENGAGE! can be sent to you free of charge. Please, just let us know your delivery address.*

Today, Mirage 2000 patches with Dassault logo are only dedicated to Air Forces flying our combat aircraft, so that you could maybe get one through Peruvian Air Force. Otherwise, the only way to order some souvenirs is through the Internet with the address given on the last page of ENGAGE! or during specific events such as Air Shows or aeronautical meetings. – Editor.

I am keen on fighter aircraft, especially the Mirage 2000. I was very pleased to discover your "ENGAGE!" publication, but, as a pity, I have only got the number 3 and 4. Would it be possible for you to send me the pdf version of number 1 and 2?

A. Joffre, France.

■ *You can have a look and copy all the pdf versions of "ENGAGE!" on Internet Dassault Aviation site. For information, DVD's were only joint to issues number 3 and 4. Issue number 1 was just an information letter and issue number 2 came out without DVD, as well as this issue number 5 – Editor.*

Would it be possible to meet "ENGAGE!" team during Paris Le Bourget 2005 Air Show. I would be very pleased to exchange some talks about fighter aircraft, especially concerning the Mirage 2000.

■ *Paris Le Bourget 2005 Air Show will be taking place between 13th and 19th of June, 2005, at Paris Le Bourget exhibition airfield. "ENGAGE!" team will be there and will be very pleased to meet some of the many ENGAGE! readers. To meet the team, just ask for them at Dassault Aviation booth. – Editor.*

Send your letters to :

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www.dassault-aviation.com



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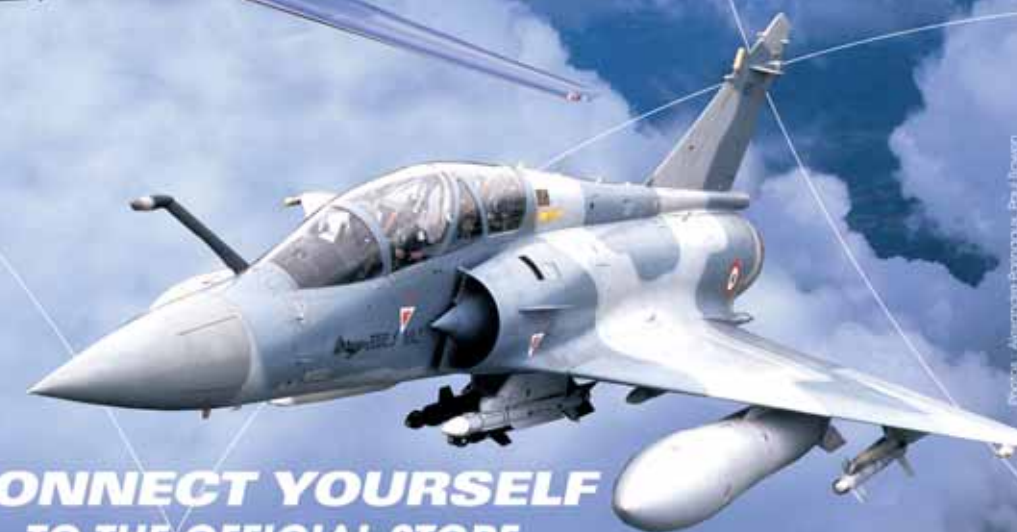
The Store



by DASSAULT AVIATION

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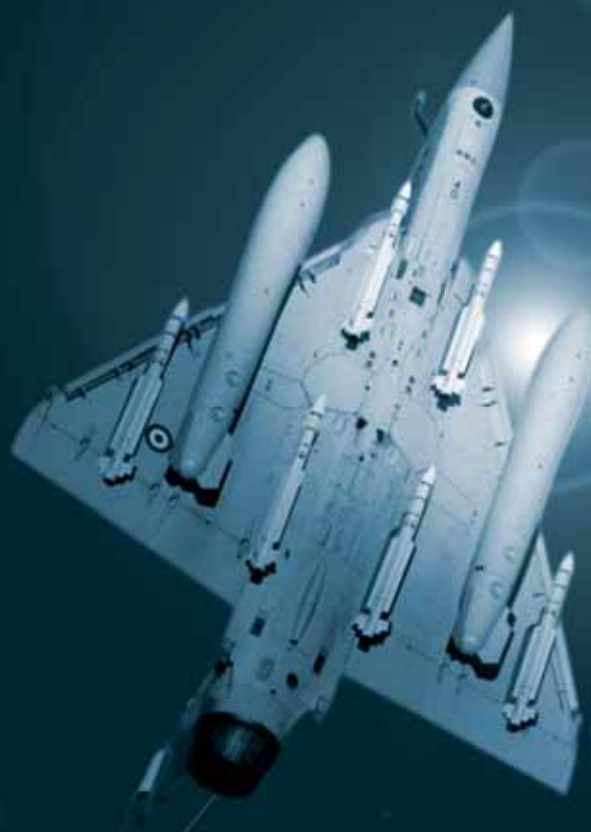
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