



SIMULATION



TRAINING



SUPPORT PRODUCTS



InterActions

JUNE 2015 – #28



SOGITEC
UPGRADES
PILOTED
SIMULATION

Rafale PILOTED SIMULATION



THE INNOVATIVE "FULLY SIMULATED" LOGIC

ULIS, "FULLY SIMULATED" TECHNOLOGY FOR A SIMPLIFIED COCKPIT

2-7



EGYPT, QATAR... SOGITEC PRIME CONTRACTOR IN SIMULATION FOR RAFALE AIRCRAFT SOLD ABROAD



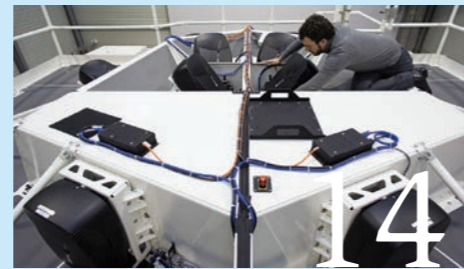
8-11



12

HUMS DISPLAYS BRAND NEW FEATURES

Processing flight data facilitates aircraft condition diagnosis on the ground and calculating potential used during flight.



14

ISS OF SIMULATORS

An innovative approach to cost management to support more than forty aeronautical simulators.



18

SPARE PARTS SELECTION: A "BOOSTER" IN ACTION

Combining automatons and 3D brings Dassault Aviation considerable efficiency in the management of Falcon spare parts chain.



16

MIRAGE 2000 I/TI MAINTENANCE

Delivery to the Indian Air Force (IAF) of the WSMT (Weapon System Maintenance Trainer) for initial and hands-on training of its WDNS (Weapon Delivery and Navigation System) specialists.

NEWS P. 21

- Le Bourget Air Show: discover the future of aircraft training and support.
- Bangalore: Sogitec was part of the major Indian aerospace event.
- ADS Show Merignac: Sogitec premium partner for aircraft support.
- Lanvéoc-Poulmic: inauguration of the MRTD-RCT building.

Editorial



ANDRÉ PIATON
Chief Executive Officer,
Sogitec Industries

“ WE STILL MAINTAIN OUR INVESTMENT EFFORTS IN TECHNOLOGIES SO AS TO BE PREPARED FOR THE FUTURE AND TO MEET OUR CLIENTS' RENEWED NEEDS ”

As I write these words, the main highlights of the year 2015 for Sogitec have been the simulation and training deals signed with the Rafale French and foreign clients. The contract with the French Forces will enable, based on the architecture developed by Sogitec, the upgrade of the Saint-Dizier and Landivisiau Rafale simulation centers to the F3-R version and procurement of an on-board trainer on the Charles de Gaulle aircraft carrier. The Mont-de-Marsan airbase will also be equipped with a cutting-edge simulation center. While simulation centers have historically been the keystone of our offer to foreign clients, the deals signed with Egypt and Qatar now also include training of crew and maintenance operators on various training tools, among which simulation-based trainers. Each of these export contracts relies on technologies which we have been working on over the last few years, as part of our investment policy, and can thus be regarded as return on investment for Sogitec.

Our Rafale-related activities should not shadow the major work done within the framework of the NH90 simulation program. The French Army Light Aviation (Aviation Légère de l'Armée de Terre, ALAT) airbases in Le Luc and Phalsbourg, the French Navy base in Lanvéoc and the Utti airbase (Finland) have all been equipped with their NH90 trainers by the deadline agreed on. The final installations included in this contract will be performed at the Hyères and Pau bases (France). In the field of training, the contract signed with the Indian Air Force regarding modernization of their Mirage 2000 fleet gave us the opportunity to develop training programs using tools such as the CBT (Computer-Based Training system) and the VMT (Virtual Maintenance Trainer), both relying on our most advanced, in-house developed technologies. This approach also forms the backbone of our Rafale training offer to foreign users of the aircraft.

At the same time, we are still working on improving our products in the field of digital documentation. By resorting to new technologies, we shall be able to offer business functions, mobile functionality, a high level of interaction and new services. The 2015 edition of the Paris Air Show is the perfect occasion for us to showcase our multi-OS (iOS, Android, Windows) and multi-platform (tablets, smart phones, PC) deployment solutions, which offer user-friendly and innovative access and navigation features and which make relevant use of 3D displays. To put it simply, we have been kept busy by all these contracts. This is something we are most happy about. We still maintain our investment efforts in technologies so as to be prepared for the future and to meet our clients' renewed needs in an even more efficient way.

InterActions is published by Sogitec Industries
4, rue Marcel-Monge – Immeuble Nobel
F-92158 Suresnes cedex – France
Tel.: +33 (0)1 41 18 57 00 – Fax: +33 (0)1 41 18 57 18
Email: contact@sogitec.fr
www.sogitec.com

Publisher and Editor-in-Chief:
Xavier Dissoubray

Editorial Committee: Christian Bigot, Jacques Bonot, Joël Clairon, Laurent Germe, François Héran, Isabelle Lavie, Étienne Marchal, Jean-Claude Perrin

Translation: Alexandra Grave

Design & Production: EffiText / Thierry Piérard

Photos – Cover: Sogitec /
Contents: ©Dassault Aviation-F. Robineau,
©Dassault Aviation-E. de Malglaive /
P. 2-3: ©Dassault Aviation-S. Randé, Sogitec /
P. 4-5: Sogitec / P. 6-7: ©Dassault Aviation-
S. Randé, Sogitec / P. 8-9: Sogitec, Eurocopter /
P. 10-11: Sogitec / P. 12-13: ©Dassault Aviation-
F. Robineau / P. 14-15: Sogitec / P. 16: DR / P. 19-20:
©Dassault Aviation-DR / P. 21: Marine nationale

Rafale

SOGITEC

UPGRADES

PILOTED SIMULATION

The purchase by both Egypt and Qatar of 24 Rafale aircraft each, long-awaited by the whole French aeronautical industry, has confirmed Sogitec Industries as the leader for procurement of Rafale crew simulation-based training systems. At the same time, the initial and hands-on training tools used by the French Air Force are also being modernized, with the implementation of the F3-R standard by 2018 in the line of sight.

The opportunity to review what Sogitec has to offer in the field of Rafale simulation.



■ **P. 4-5** – Innovative “Fully Simulated” technology for Rafale Simulation Centers (CSR / Saint-Dizier Air Force Base and Landivisiau Naval Air Station).



■ **P. 6-7** – Egypt, Qatar... Sogitec prime contractor in simulation for Rafale sold abroad.



Rafale

Rafale Simulation Center,
Saint-Dizier Air Force Base.

IMPROVED EQUIPEMENT AND PERFORMANCES FOR OPTIMIZED OWNERSHIP COST

In the continuity of the improvements of the French and Finnish NH90 training medias, the display system of the current Rafale simulators will also be modernized by Sogitec and integrated into the new systems. Images will be generated by Apogée™ 8, latest version of the Apogée™ image generator developed by Sogitec.

Its main new features include the “true horizon” enabling true to reality visibility of 400 km at 50,000 ft (the upper limit of the Rafale flight envelope) and the geosynthetic textures (20-cm precision) which make terrain restitution more realistic. The “world” terrain database is generated by the Sindbad™ 3 database creation tool.

What’s more, Sogitec’s SAFIR™ faceted dome, typical of the Rafale Simulation Centers, will be upgraded with enhanced contrast back-screen projection and very high definition projectors (8 megapixels).

* See *InterActions* #26, June 2013.

THE INNOVATIVE “FULLY SIMULATED” LOGIC

More than 10 years after the launch of the works which would lead to the delivery of two Rafale Simulation Centers (Centre de Simulation Rafale, CSR) to respectively the French Air Force (Saint-Dizier Air Force Base) and the French Navy (Landivisiau Naval Air Station), Sogitec is bustling about again. The initial and hands-on Rafale training are meant to turn another corner with the signature of exportation deals, the modernization of the French CSRs and the delivery of complementary simulators to the French Forces to be ready for the implementation of the F3-R standard of the aircraft.

Awarded by the French Defence Procurement Agency (Direction générale de l’armement, DGA) to Sogitec Industries, acting as prime contractor, and Thales, the co-contractor, the deal regarding modernization

of the existing simulators and procurement of new systems includes a great number of technological and software improvements from which the French Forces will benefit and which will also be of interest to the future foreign users of the Rafale. The “modernization” part of the deal concerns the four simulators operated in Saint-Dizier and the two simulators operated in Landivisiau. The “new system” part includes procurement of a new two-cockpit CSR to the French Air Force base of Mont-de-Marsan and of an on-board trainer (E2) on the Charles-de-Gaulle aircraft carrier for the French Navy.

Increasing training capacities

Following the dynamic and the logic of the F3-R program, the simulation centers will first see their training capacities increase as the actual platform is being transformed.

Launched by Jean-Yves Le Drian, French Minister of Defense, the new standard relies essentially on the integration of new stores such as the long range air-to-air Meteor missile or the new generation laser designation pod. It also encompasses improvement of the aircraft Weapon Delivery and Navigation System capacities, tactical data links, RBE2 active electronically scanned array radar and SPECTRA electronic warfare and countermeasures system. All of these improvements will be implemented for the French Forces as early as 2018.

Becoming less dependent on actual equipment through “fully simulated” technology

In all major programs concerning procurement of training media to operational staff, the initial and hands-on training tools are by default delivered once the platform is

operational. As far as the Rafale F3-R is concerned, the new-standard aircraft and modernized simulators will be delivered simultaneously following a concurrent engineering approach. This has never been the case for any other French combat aircraft. Full of more than 30 years of experience in the field of simulation-based training media, Sogitec is responsible for defining the global architecture of the simulator, including the architecture of the Rafale simulation in the strict sense. The company is also in charge of developing the aircraft simulation for the majority of the systems and equipment items, based on the innovative “fully simulated” logic. The initial architecture of the simulators—delivered in the F2 standard then updated to the F3 standard—relied greatly on the use of actual equipment, which was necessary at the time. “With a view to eventually optimise the cost of

ownership of such simulators for the client and facilitate successive improvements of the simulation media as the aircraft is enhanced, Sogitec has spent the last few years investing in simulation so that it can become less dependent on actual equipment which was not suited to the constraints of simulated media”, Christian Bigot, the Head of the Rafale simulation program for French and foreign clients, explains. The main module which gives a structure to this device is called the “system core”. It is made up of an array of models developed in the F3-R standard based on aircraft design data and following a process reducing the use of actual equipment to the minimum. This “fully simulated Rafale” will be operated in the modernized CSRs and used for the new complementary media, as well as in the simulation centers sold abroad (see *infra*).

Sogitec’s proven experience in prime contractorship

The other works have also been distributed between Sogitec and Thales. Thales is in charge of the cockpit. The modernized instructor operating station and tactical server (CGF, Computer Generated Forces) are developed jointly by both companies. The E2 implemented on the aircraft carrier is remarkable as, despite the limits of its config-

uration in terms of volume (simple display system) and performances (limited number of lower CGF virtual actors), its capacities both in terms of procedural and operational training are rigorously similar to that of a regular Rafale Training Center.

Finally, the Centers’ upgrade allows for improving their distributed training capabilities (increased HLA gateway performances and networking via optical fiber) while taking into account new requirements linked to security of the information systems that contractors must follow. ■



Rafale

EGYPT, QATAR...

**SOGITEC
PRIME CONTRACTOR
IN SIMULATION FOR
RAFALE SOLD ABROAD**

The two Rafale export agreements signed in mid-February and at the beginning of May 2015 reinforce Sogitec's role as the premium provider of initial and hands-on training systems. Sogitec, as a prime contractor and simulation designer for Rafale aircraft sold abroad, will indeed provide the Egyptian and Qatari Air Forces with simulation tools sharing many similarities with that operated by the French Forces and currently being modernized.

The best of simulation technologies

Just like for the French CSRs, a simulation center comprising two networked simulators will eventually be delivered to each client country, with operating capacities very similar to those presented before when describing the French centers. The new feature of the Rafale crew simulation-based training for the foreign clients is the ULIS (Unit Level Instruction System) procedures learning and repetition system trainer, a light tool deployed within a squadron. The CSR, E2 and ULIS systems are vivid examples of the most advanced simulation technologies developed and operated by Sogitec so as to provide the French, Egyptian and Qatari Forces with cutting-edge training and operational preparation tools, now and in the forthcoming years. ■

ULIS, "fully simulated" technology for a simplified cockpit

The cockpit is simplified, with its equipment displayed on touch-screens. The system also includes a large flat screen displaying the outside world and an integrated head-up display, and simplified stick handgrip and throttle. Still, ULIS is based on the "fully simulated" technology and includes a full visual environment (external displays and sensors), an instructor operating station and a tactical server which, although not as advanced as the CSR's, enables implementation of friend or foe.





NH90 MULTI-ROLE TRAINING DEVICE ON TIME IN FINLAND



The NH90 is in service in the Utti Jaeger Regiment, the Finnish Army training and development centre for special forces and helicopter operations.

As the Finnish Army's NH90 Multi-Role Training Device (MRTD) will enter service this month, InterActions heads north to get from Finland's military helicopter operators their expectations regarding NH90 training.

“ Given the MRTD's expected range of capabilities, 60% of initial training will be conducted with the simulator, as well as 25% of recurrent and tactical training. ”



Lieutenant Colonel JARO KESÄNEN, Finnish Army, Commanding Officer, Helicopter Battalion, Utti Jaeger Regiment.

After 3 years in the Navy, he joined the Army Aviation 15 years ago. He first held different operational and training positions within the Helicopter Battalion at Utti Army Base, notably Company Commander and Executive Officer. He was part of the first Finnish batch that was delivered NH90 training in 2008, and he flew the NH90 as Pilot in Command and Instructor Pilot between 2009 and 2012, when chief of flight training in the Army Command. He has been commander of the Helicopter Battalion since 2013.

What is the context for Finnish Forces of increasing operational work and training with the NH90?

In 2001, Finland ordered 20 NH90 TTH to replace the ageing fleet of Mi-8. So far, 19 NH90 have been delivered, first 15 to a "Initial Operational Capability" (IOC and IOC+) then upgraded to the "Final Operational Capability" (FOC). The upgrade to FOC is in progress. The Helicopter battalion of the Utti Jaeger Regiment is the sole helicopter unit in the Finnish Defense Forces (FDF). Hence it is responsible for all FDF helicopter operations in the three main areas of missions assigned to FDF: National Defense, Support to Government Authorities (ca. 30 missions per year), and International Crisis Management. The latest is still small, but rapidly developing in the frame of the European Union Nordic Battlegroup

and its 51 Finnish NH90 personnel and two helicopters in readiness in medical evacuation (MEDEVAC) role.

What training objectives does the acquisition of the Multi-Role Training Device (MRTD) answer?

The procurement of an MRTD from Sogitec addresses the whole spectrum of FDF helicopter training needs, from conversion-to-type for young and experienced crews, to recurrent and tactical training: day and night-time, all weather conditions, fault and failure management, emergency procedures, troop transport, hoisting, loadmaster...

What is the time distribution between simulated and real flight training? And initial and tactical training?

Maximum availability of the real helicopter only for operational missions—i.e.

outside training—is our primary goal. This is why simulation will be used a lot. For the next couple of years, the aim is to perform a minimum 30% of total flight hours with the MRTD. If availability of the MRTD is as expected, this total can later increase even up to 40%. Given the MRTD's expected range of capabilities, 60% of initial training will be conducted with the simulator, as well as 25% of recurrent and tactical training.

What is the range of operational missions helicopter crews are trained for using the MRTD?

The MRTD will be used for most tasks performed under the three main types of missions mentioned above. This includes, in addition to conventional troop transport, Special Operations, maritime Search & Rescue (SAR), Police operations, firefighting, MEDEVAC, etc.

What are your expectations towards Sogitec in terms of support and availability?

As for French Forces, a 95% availability record for the MRTD is expected. Keep in mind we previously used to train abroad, which implied a lot of travelling and was not very cost efficient overall. From now on, the simulator is ours, right here in Utti, and shall be used on demand, hence our high expectations in terms of availability. We firmly believe it will be met as we deem excellent the job done by Sogitec so far, as delivery on schedule shows. ■



NH90 SWEDEN

Following France⁽¹⁾ and Finland⁽²⁾, Sweden has become Sogitec Industries' third customer in the frame of NH90 Training Media program.

The contract for the delivery of training services relies on the French Army Light Aviation's NH90 Joint Training Center (Centre de formation inter-armées, CFIA) Full Flight Simulator (FFS) and Multi-Role Training Device (MRTD), and confirms Sogitec's status as a key partner of Forces operating the NH90. Since 2010, CFIA has been training French Army Light Aviation and Navy NH90 crews and maintenance technicians. CFIA is the first and main beneficiary of the NH90 Training Media contract awarded to Sogitec Industries by NAHEMA, acting on behalf of NH90 Nations. The MRTD

has been delivered and in operations since November 2013. The FFS is under delivery and will enter into service during summer 2015.

An international "users' club"

The international focus of the CFIA already brings in Spanish and Belgian crews that train using CFIA means, and Sweden today joins the Center's piloted simulation users' "club". According to the contract awarded by the FMV agency (*Försvarets materielverk*, Defense Materiel Administration) to Sogitec, Swedish Air Force (SwAF) and FMV T&E (Tests and Evaluation) HKP14 (as the NH90 is

known locally) crews and instructors use the simulators. Training goes until 2021, with the firm tranche ending in 2018.

A total 2,000 training hours

The 2001 "Nordic" contract states Sweden procures 13 NH90 TTH and 5 NFH, of which 8 are in service today. Like their French counterparts, Swedish personnel have been using since April 2015 all MRTD procedures and tactical training capabilities—and FFS starting in September 2015—especially for SAR

(Search and Rescue). A total 2,000 training hours will be delivered to SwAF and FMV T&E personnel. 300 hours are planned in 2015, for a steady increase up to 800 training hours in 2018. ■

⁽¹⁾ See *InterActions* #26, June 2013, "NH90 Simulation—Sogitec at the Heart of Operational Challenges".

⁽²⁾ See *supra*, pages 8-9.

⁽³⁾ Joint acquisition contract Finland, Norway, Sweden.

⁽⁴⁾ *Tactical Transport Helicopter*, Army version.

⁽⁵⁾ *NATO Frigate Helicopter*, Navy version.



MISSION REPORT

HUMS DISPLAYS BRAND NEW FEATURES

If the Rafale can offer extremely high availability rates for such a demanded combat aircraft, it is notably thanks to HUMS, its technical restitution system, which adapts to the users' new needs as the aircraft is developed. Following the example of the French Forces, Rafale foreign clients will also benefit from it.

As already mentioned in a previous issue of InterActions*, HUMS (Health and Usage Monitoring System) remains truly singular among the products Sogitec has to offer as it is a genuinely operational means enabling both preventive and curative maintenance of the Rafale. During all flight phases (from engines start until engines stop), the MDPU (Modular Data Processing Unit) is in charge of collecting technical data for maintenance purposes. This data is stored on a PCM-CIA card-type cartridge. This card is then used on the ground by the HUMS software, which processes the data it contains with two purposes: on the one hand, to facilitate aircraft condition diagnosis on the ground (possible malfunctions or failures of the aircraft systems and equipment); on the other hand, to calculate the potential used during flight so as to manage the wear of the monitored equipment items. A wear technical synthesis is then transmitted to AMASIS,

the French Forces' maintenance management system to which HUMS is interfaced.

New software architecture

Used for about 15 years in the French Navy and for nearly as long in the French Air Force, HUMS is still being developed: a new software architecture is about to be released. It will facilitate deployment, installation and maintenance of the application on computers, a true improvement since, as Isabelle Lavie, Program Manager at Sogitec Industries, explains: "HUMS is deployed at every location where the Rafale is used: missions abroad, aircraft carriers, prepositioning forces, etc." with all or part of each aircraft's history. In addition, special attention is paid to security of the information systems so as to make HUMS perfectly secured when deployed on Intradef, the Intranet network of the French Ministry of Defence and to maintain direct link between the cartridge and the aircraft while preventing any damage or endangerment of the exchanged data.

Data available for the ground crews

HUMS has been further improved to integrate "a Man-System Interface (MSI) and fully redesigned and smoother-running navigation principles as a preparation to the future deployment of a touch-sensitive version of the system, for a truly autonomous 'on the line' diagnosis supporting tool", Isabelle Lavie says. In the very near future, use of the diagnosis supporting data entered by the Rafale joint service technical team will no longer be limited to the runway office or the technical office. This data will be available for ground crews and maintenance operators. Major efficiency gains and time savings are expected since, as Isabelle Lavie explains: "HUMS is used to decide whether the Rafale should be made available for flight and it must therefore provide the operators in charge of setting the aircraft back to flying condition with all the data they need".

Integrating software elements developed by other Rafale OEMs

If the F3v5 version is currently used, the future lies in the F3-R version, which should be implemented around 2018 and which will have major impact on HUMS. The extended enterprise logics consisting in integrating software elements developed by other Rafale equipment manu-



HUMS WILL BE DEPLOYED IN THE EGYPTIAN AIR FORCE

Keystone of the Rafale integrated logistics in France, HUMS in its F3v5 then F3-R version is also destined for the same use by the Rafale operators abroad. Just like its French counterpart, the export version of HUMS will perform technical restitution missions for the Rafale and will be interfaced with the logistical means of the foreign forces operating the aircraft. It will be deployed as early as July 2015 in the Egyptian Air Force. It will also be interfaced with the Rafale's Electronic Documentation System (EDS). The documentation will thus be accessible in context by a single click. More importantly, it will be integrated into the Virtual Maintenance Trainer (VMT) for all matters related to curative maintenance. Since initialization of troubleshooting processes and diagnosis support rely on the operational data provided by HUMS, it is part of the Rafale maintenance operators' practical training. It is now time for HUMS to go beyond the French Forces and illustrate its extended capacities internationally.

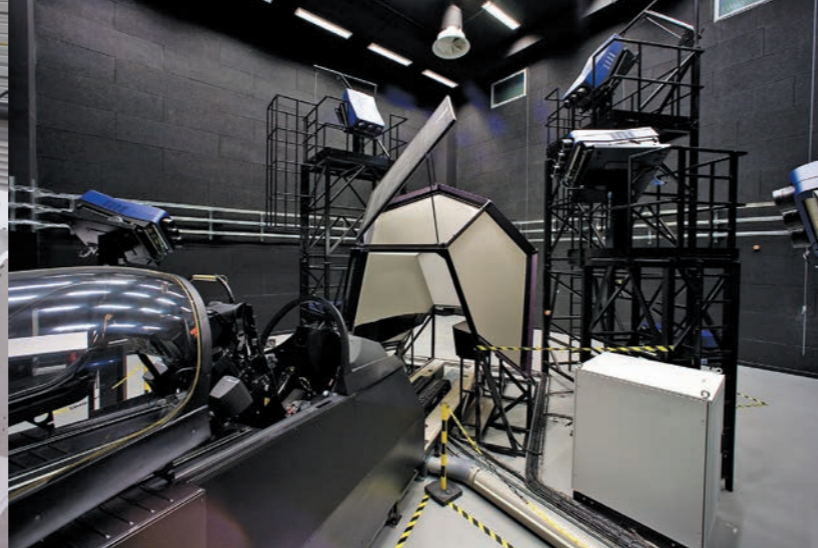
facturers (SNECMA, Thales, etc.), which served as a base for the F3v5 version of HUMS, will be even more observed for the F3-R version. Case in point: the implementation of advanced flight data analysis algorithms for specific systems such as the SPECTRA countermeasures system (Thales). The F3-R version of HUMS will also offer additional diagnosis support functions using the results of the diagnosis studies. ■

* See InterActions #25, June 2011, "Integrated support products: consistency with the MRO suite", p. 5.





FFS NH90, Inter-Armies Training Center (Centre de Formation Inter Armées / CFIA, Cannet-des-Maures).



Rafale Simulation Center (Saint-Dizier Air Force Base).



FNPT Dauphin (Lanvéoc-Poulmic Naval Air Station).



FMS Mirage 2000-5 (Nancy-Ochey Air Base).

ISS OF SIMULATORS

AN INNOVATIVE APPROACH TO COST MANAGEMENT



FNPT Grob 120 (Cognac Air Force Base).

SIMMAD (Structure Intégrée du Maintien en conditions opérationnels des Matériels de l'Aéronautique de Défense), an integrated structure in charge of the In-Service Support (ISS) of the French Forces' aeronautical equipment, has renewed its trust in Sogitec Industries and its partner Thales to support more than 40 aeronautical simulators. The execution logic underlying this new ISS deal is brand new.

In fall 2014, the SIMMAD has awarded Sogitec and Thales, as co-contractors, a support deal for all of the simulators operated by the French Forces (Army, Navy and Air Force) and the DGSCGC (Direction générale de la sécurité civile et de la gestion des crises), the Civil Defence and Security Directorate of the French Ministry of the Interior. The deal thus encompasses a total of 44 simulators and trainers.

Invoicing based on actual use of simulation

The procurement of support services to the SIMMAD by simulation experts is not new as Sogitec and Thales were already in charge of the support to the systems they respectively deliver to the Forces within the framework of long-term contracts. Still, against the backdrop of strong constraints weighing on the Defence budget and contract renewal deadlines, ISS was rethought by both the state and industrial partners.

"The deal was discussed on the basis of a strong requirement: cost optimisation", Étienne Marchal, Customer Support Manager at Sogitec, explains, "and the means involved must guarantee a permanently high level of availability to the users". Cost optimization implies something new: "part of the amount invoiced by the company now varies as it is now based on the actual use of the simulation and training media by the users", Étienne Marchal also said.

Rafale Simulation Centers part of SIMMAD's ISS deal

This is the reason why Sogitec and Thales have chosen to affect, within the framework of this new ISS deal, not only a considerable part of their factory structures but also full-time, on-site (bases, training centers, etc.) technical assistants. Sogitec's part of the deal includes 18 simulators installed in 9 sites, 8 of these simulators coming with on-site technical assistance. Previously supported by the French Defense Procurement Agency (Direction générale de l'armement, DGA) and both companies, the two Rafale Simulation Centers in Landivisiau and Saint-Dizier are now part of the SIMMAD's ISS deal.

"Besides simulators maintenance", Étienne Marchal added, "other services are now part of a package, like obsolescence watch, support for EASA certification, configuration management and update of the user and maintenance manuals". Thanks to their efficient partnership and, more particularly, to a close collaboration when it comes to supporting CSRs, Sogitec and Thales directly and constantly contribute to maintaining a high operational level for the Forces. ■



Pilot report
Flight Fault Record

DIAGNOSIS



- Ground Status Report
- Analysis of documentation
- Integrated Maintenance Checks
- Specific Tests Procedures

LRU
Replacement

LRU

VALIDATION



- Ground Status Report
- Integrated Maintenance Checks
- Specific Tests Procedures

PRINCIPLE OF WDNS TROUBLESHOOTING ON MIRAGE 2000 I/TI



MIRAGE 2000 I/TI: A MAJOR PEDAGOGICAL STEP FORWARD

As we wrote it at the time the program was launched in 2013, the WSMT is «implemented on PC desktop stations installed in classrooms in order to meet O-level weapon system maintenance training needs». A training exercise typically unfolds as follows:

- “immersion in a comprehensive virtual environment”;
- “diagnosis and virtual locating of the faulty LRU, followed by its replacement”;
- “operational use by the trainee of additional ground maintenance and its associated means”.

100 basic exercises included

Not just another maintenance training tool? Indeed not, as François Heran, Program Manager at Sogitec, explains: “the strength of the WSMT lies in the fact that users can modify their training device depending on their needs”. The initially delivered version of the WSMT includes 100 basic exercises: 75 WDNS failure scenarios and 25 ground procedures, which can last up to 4 hours and which

In July 2011, the Republic of India’s Ministry of Defence awarded Dassault Aviation and Thales a contract for the renovation of the Indian Air Force (IAF) 51-aircraft fleet of Mirage 2000. The first phase, which lasted about 4 years, ended on March, 25th 2015 when the client was delivered its first two Mirage 2000I/TI. At the same time, Sogitec has just delivered the WSMT (Weapon System Maintenance Trainer) to the IAF for initial and hands-on training of its WDNS (Weapon Delivery and Navigation System) specialists.

can be displayed in virtually any language supported by Microsoft Word. The authoring tool delivered with the trainer enables IAF maintenance instructors to modify all or part of each of the 100 initial exercises and to create new ones.

A fully autonomous system

Sogitec has indeed included within the WSMT a simple and consistent scenario authoring process which François Heran describes to us: “the instructor carries out a technical analysis of a given failure and of the associated diagnosis process on the basis of the technical documentation. He then authors a scenario using a dedicated Microsoft Word add-in. New graphics is also generated via the integrated Microsoft Blend tool, whereas behaviour of the systems is modelled in C#. Additional documentation (aircraft or equipment) can also be integrated.”

This fully autonomous system thus enables the IAF to widen its job scope as, besides instructors, graphic designers and IT developers will also be needed. Another string to its bow is the fact that

the WSMT integrates a fully-featured Learning Management System (LMS). The LMS enables assessment of the trainees’ progression via a performance report, the possibility to give them marks and the computation of statistics. It also hosts theoretical training supports (used for maintenance personnel and pilots), which can be associated, if needed, to the supports and contents coming from the WSMT. Consistency between theoretical and practical training is therefore guaranteed.

Operational in the maintenance personnel training center

The WSMT was presented to the Mirage 2000 I/TI program team of the IAF in February 2015. It meets the requirements of the Forces and it will be operational in the maintenance personnel training center (TEchnical Type TRaining, TETRA) of the Gwalior Air Base (Madhya Pradesh state) in July 2015. A class has been equipped for the trainees to use the WSMT in the various modes: free, guided (with virtual “coach”), assessment with no “coach”, review, repetition of an operation.

A reference in the field of Mirage 2000 maintenance training

Now compliant with the IOC (Initial Operational Clearance) version of the aircraft, the WSMT will be upgraded to the FOC (Final Operational Clearance) version by the IAF in association with the Indian company HAL. To this end, and more generally to help the client get acquainted to the system, Sogitec provides on-site technical assistance during the first 6 months. The WSMT operated by the Indian Forces is about to become a reference in the field of Mirage 2000 maintenance training and should therefore draw the attention of the whole community of Mirage 2000 operators worldwide. ■

* See *InterActions* #26, June 2013: “India: Maintenance Training for Mirage 2000 I/TI”, p.16-17.

अभियंता का विरट्ट



SPARE PARTS SELECTION

A “Booster” IN ACTION

In the context of the Supplemental PLM extension—which is now complete—and of automation of both engineering and manufacturing sites (eSpec process) by Dassault Aviation, Sogitec’s “Boosters” solution offers major efficiency improvements*. A “Booster” relies on automatons, i.e. algorithms using any usable piece of data, and a powerful 3D engine so as to define and generate missing elements. Two years after “Boosters” were first introduced, an operational assessment of their efficiency.

* See *InterActions* #26, June 2013, “Full efficiency for ‘Supplemental’ techpubs processes thanks to ‘Boosters’” and #27, June 2014, “‘Boosters’: new generation technical publication tools still on the rise”.

LAURENT PICART, Spares Engineering Manager at Dassault Aviation, is part of Dassault Aviation’s Falcon World Wide Spare Organization, which manages the whole range of Falcon aircraft spare parts (from the Falcon 10 to the Falcon 5X version, for both basic and completion parts) worldwide. He is responsible for the quality and efficiency of the spare parts selection process and is also in charge of feeding the identification documentation (IPC & SIPC) with data that is essential to all spare parts providers and customers, whether internal (Dassault service stations) or external (clients, authorized service stations, operators).

INTERACTIONS – What is the total number of spare parts available for Dassault Aviation civil aircraft?

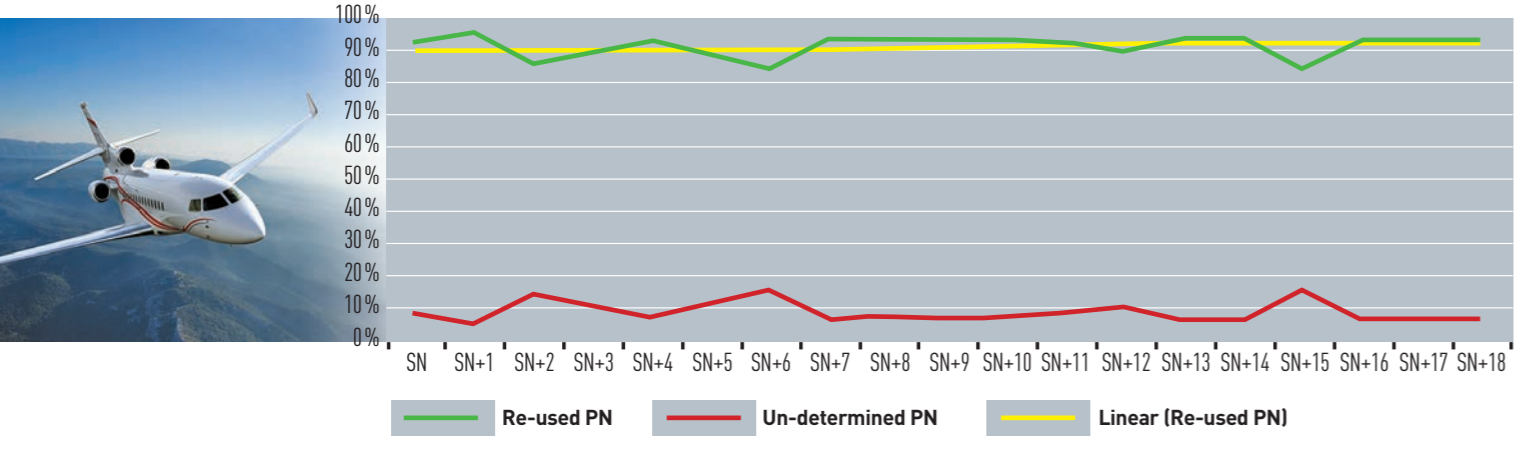
LAURENT PICART – We have listed about 220,000 references for basic aircraft and 140,000 references for commercial “Completion” parts in the “Master List”, Dassault Aviation’s international directory of spare parts, which represents a total of 778 million dollars of spare parts in stock in our 14 spare part centres worldwide. Eager to better serve our new clients in their country, we are constantly opening new centres and relocating our stock, as will be the case shortly in Louisville (Kentucky, USA) or Lagos (Nigeria). This is why we were awarded best score and best progression in the AIN’s 2014 FBO survey, both in terms of part availability and price.

Could you explain your job in more details, what is spare parts selection?

Spare part selection follows a relatively simple and standardized (at least seemingly) identification and analysis process. For every new aircraft or aircraft version, the new spare parts first need to be identified. It is then necessary to determine, on one hand, whether these parts are subject or not to maintenance and, on the other hand, whether they are removable or not. From there, money is also taken into account so as to favour positive return on investment, although safety remains our foremost priority. This analysis is conducted for all Falcon aircraft based on, for the basic part, the data provided by Dassault Aviation’s Design and Engineering Office and/or partners for the Falcon 7X and 8X aircraft. The data taken from this spare part engineering activity within Dassault’s PLM is then compiled so as to obtain an update of the spare part list which can be directly imported into the “Master List”. Every entity or person involved in the “spare part chain” (IPC authors, spare part centres, providers, etc.) can then use this updated “Master List”.



RE-USE RATE OF SPARE PARTS RECORDS
EXAMPLE OF A FALCON 7X FLEET (SN...SN+18)



Why did you appeal to SOGITEC's specific expertise?

Our Program Management Directorate has implemented within version V5 of the PLM, in association with Dassault Falcon Jet (DFJ) in the United States and the Merignac facility, algorithms used in the definition and industrialization phases so as to make the most of similarities between different aircraft, to put it simply. Our aim is to reduce costs while offering the customer the customized interior layout he/she wishes for. Similarly, our Program Management Directorate has also asked Sogitec to do the same for the maintenance documentation (SMM, Supplemental Maintenance Manual) and the spare part catalog (SIPC, Supplemental Illustrated Parts Catalog). From this moment on, we have identified an opportunity to industrialize our spare part selection processes via this "Documentary PLM" so as to benefit from a «worldwide» tool and thus ensure consistency of the spare part engineering and SIPC authoring activity. Since 2009 and the launch of joint research in association with Sogitec, two «Boosters» called SPL and SIPC Automaton have been implemented. Our spare part selection process has been greatly and undeniably made more rational and smooth as a result from this. The research was carried out in association with Dassault's information system office (Direction générale du système d'information, DGSi), DFJ and, obviously, Sogitec. All the teams involved in the research were fully committed and now better understand what is at stake when it comes to spare parts management.

“Sogitec has provided us with the 'missing link' of the completion spare parts chain which enables us to produce literally 'more for less.'”

What was Dassault Aviation's target figures?

Our goals were ambitious and they were all met, if not exceeded. We were able to unify our spare part selection process, as explained before. The cost of the spare part selection process was reduced by half. Gains in terms of quality are also spectacular as the SIPC now reflects 100% of the spare part selection, which itself reflects 100% of the aircraft definition (Electronic Bill of Material, EBOM and Manufacturing Bill of Material, MBOM). In more general terms, we first targeted a return on investment of about 15% after the "Booster" implementation and it has now exceeded 40%. The solution proved so efficient for the Falcon 7X (the only aircraft originally concerned by the new spare part selection method) that we extended it to the Falcon 900 and Falcon 2000 aircraft. It will also be applied to the Falcon 8X and 5X aircraft, two aircraft for which return on investment is going to be even greater.

On a daily basis, what has changed for you and the whole spare part chain since the introduction of the "Booster"?

First, the SPL Automaton "Booster" has spared us the "low level" tasks, in particular those related to office automation. For example, part numbers (PN) can be very similar from one reference to the other: FH379872498472-1 versus FH379872498472-2. When previously, a lot of time was lost searching and entering PNs, with the risk of making mistakes, an algorithm now detect minor differences in PNs and offers the user the possibility, subject to his/her confirmation, to apply to a given PN the same status as a similar PN. This may seem pointless, but it is essential as selection of the wrong spare parts may lead to the purchase of useless stocks or, on the contrary, aircraft grounding due to unavailability of the spare part needed. Another, even more essential, feature of the "Booster" lies at the very core of the "Booster" philosophy: reuse. Reuse of the spare part selection history is now automated as much as possible. This is how all spare part selection - or non-selection - decisions made 6 months, one year, two years ago, possibly on any site and by another user, remain applicable, included to new completion parts. Finally, and more generally speaking, we now benefit, thanks again to the Sogitec expertise and the joint work, from a unified and simplified work environment: a 3D window (EBOM & MBOM and parts geometry) on one hand, a window including the consolidated part list on the other hand, and a worldwide base used by all, which is even more relevant now that all authors use the same authoring tool.

Your first general assessment of this association sounds positive, does it not?

The outcome of our association with Sogitec is unquestionably very positive. Sogitec has provided us with the "missing link" of the interior completion spare part chain in the form of a software - the "Booster" - which enables us to produce literally "more for less". This quality gain justifies the development of a Documentary PLM using extremely reliable data to facilitate, day after day, the work of any organisation using Falcon spare parts ■



JUNE 15-21: DISCOVER THE FUTURE OF AIRCRAFT TRAINING AND SUPPORT AT THE NEXT PARIS AIR SHOW

For the 51st Paris Air Show, the world's aerospace industry's premier event, Sogitec Industries unfolds an ambitious set of demos to introduce its latest innovations. On a bigger booth (203 sq. m), simulation and training are at the center of Sogitec's communication with the ULIS trainer (see p. 7) for Rafale. It is shown with a real time visual system implementing Apogée™ 7 image generation, a Sindbad™ 3-EX database, and a three-channel rearprojection system. Maintenance training solutions are presented with our products for Rafale (see p. 2-7), Mirage 2000 (see p.16) and Tiger. Technical publications engineering definitely leans towards the future use of techpubs within a web-of-things approach: consulting FIELD on tablets and smartphones, connected watch for operational maintenance on an actual landing gear. ■



SOGITEC AT AERO INDIA

February 18-22, 2015, Sogitec was part of the major Indian aerospace event, along with its parent company Dassault Aviation.

A few months ago in Bangalore was held the 10th Aero India event, India's biggest aerospace and defense tradeshow and one of Asia's premier events in the industry. During the 5-day indoor/outdoor exhibition, more than 150,000 trade and 300,000 general

public visitors had the opportunity to admire and assess the overall performances of aircraft and products by 750 exhibitors, including 35 French companies. For the second show in a row, Sogitec was there, on Dassault Aviation's booth, to present to Indian professionals and public its simulation and training and technical publications engineering so-

lutions: Rafale flight simulation, including Rafale Simulation Centers; Mirage 2000 I/TI WSMT maintenance trainer (see p. 16-17); Rafale Maintenance Trainer (RMT), for diagnosis training; documentary tools, with the viewing solution FIELD 5. These demonstrations supplemented well Dassault Aviation's presence with a Rafale C and B, in partnership with the French Air Force, and a Falcon 7X and 2000 LXS. ■

LANVÉOC-POULMIC : INAUGURATION OF MRTD-RCT BUILDING AT NAVAL AIR STATION



The building hosting the MRTD-RCT in Lanvéoc-Poulmic Naval Air Station was inaugurated and baptized May 22, 2015. All participants could appreciate the MRTD-RCT's capabilities during a ceremony that was presided over by Rear Admiral Jean-Philippe Chaineau, French Navy Deputy Chief of Staff for Plans and Programs, André Piaton, CEO Sogitec, and Captain Frédéric Babin-Chevaye, Navy Aviation Chief of Staff. The building bears the name of Lieutenant François Sénéé, who died in 1999 flying his Lynx helicopter during an anti-submarine operation. Lanvéoc-Poulmic NAS Commander, Captain Eric Luxembourger, paid tribute to him. ■

SOGITEC, PREMIUM PARTNER FOR AIRCRAFT SUPPORT

The second ADS/UAV SHOW, dedicated to military aircraft ISS (In-Service Support) and UAV (Unmanned Aerial Vehicles), was held at Bordeaux-Mérignac Air Force Base, September 9-11, 2014. Having exhibited at the first show in 2012, Sogitec was this time a "Premium" partner for this event dedicated to military aircraft ISS and Integrated Logistic Support (ILS) specialists. With a total 160 exhibitors, 6,500 visitors and 20 foreign delegations, this post-summer vacation event was certainly not to be missed. With a booth displaying the company's capabilities in the field of maintenance training simulation (WSMT Mirage 2000 I/TI, Tiger Maintenance Trainer, Rafale Maintenance Trainer), techpubs engineering (FIELD 5 on iPad and Microsoft Surface for the first time), and maintenance assistance (Maintenance Booster Rafale), armed forces and industry visitors assessed the full consistency of Sogitec's offer in the field of aircraft support. ■



www.sogitec.fr