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ROMANIAN AIR POWER



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During the last two decades, Romania has emerged from being a Communist dictatorship and is now a well-respected NATO and EU member. Its commitment to important international peacekeeping missions and participation in many NATO, Partnership for Peace and bilateral exercises has illustrated Romania's ambition to be an active partner, and the Romanian AF has likewise been evolving. Marnix Sap and Carlo Brummer went there to find out more, and capture some exclusive air-to-air photos — the best coverage of the RoAF.

LIVING LEGENDS

There is, one might think, little that could add to Duxford's lustre as a fighter station. Yet, even for the illustrious likes of Bader, Deere and Malan, the contents of a Duxford hangar like The Fighter Collection's would have been the stuff of dreams. Ben Dunnell reports on TFC today, and previews Flying Legends 2009.



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RACING BULL

Andreas Spaeth is a brave man — he put himself through the Red Bull Air Race experience in Abu Dhabi, by strapping into the back of a two-seat Extra and sampling something of the demands of this rigorous, fast-moving aerial sport. It's a great article.



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Contributors

Aircraft uses the best in the business...

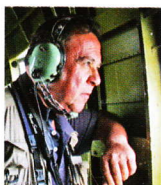
Frank Crébas says: 'It's a huge honour for me to appear here in my favourite aviation magazine. In 2007, Stephan de Bruijn and I started an ambitious book project that will feature today's Royal Netherlands AF. This has given us a great insight into the service and helped us in compiling this month's feature. Our book, 'Air Power 2010', will hit the shelves in June 2010, in both Dutch and English versions.'



Stephan de Bruijn was infected by the military aviation virus in 1977 and has been writing articles on a freelance basis since the mid-1990s, but it was nice for him to do a feature about his home nation's own air force for publication in *Aircraft*. The 'Air Power 2010' book he's writing with Frank Crébas will, he says, be the crowning glory of their hobby to date.



Frank B. Mormillo describes himself thus: 'Basically, I'm just a grandfather with a camera and a passion for photography and airplanes. Frustrated in my early efforts to become a fighter pilot, I turned to aviation photography nearly 50 years ago, and I have flown in too many aircraft to count since then. Meeting so many great photographers over the years has been one of the benefits of the job.'



Marnix Sap tells us: 'When Lt Gen Constantin Croitoru, then Chief of the Romanian AF Staff, invited my associate partner Carlo Brummer and I to become the first foreign journalists to undertake an exclusive air-to-air report, we knew it was something very special. Impressed by its rich history, we were amazed to see how some impressive upgrade programmes and reorganisation efforts have resulted in a well-trained and modern air arm.'



Andreas Spaeth went to some extremes for his articles in this issue. First he flew to the exotic Himalayan kingdom of Bhutan, to report on flag carrier Druk Air. Then it was off to the Persian Gulf, where he met with different airlines to find out how they're coping with the recession. But he saved the best for last: trying out for himself what it feels like to take part in the Red Bull Air Race in Abu Dhabi.



It is perhaps in the loving preservation of historic aircraft, whether static or flying, and the varied displays seen by millions at the world's air events, that the joy many feel for aviation has its truest expression. I have just returned from a fantastic long weekend at the La Ferté Alais show in France, a place that simply cannot fail to delight through its utter charm and the obvious enjoyment of all involved in flying or watching aircraft — from Blériot to Rafale — at such a lovely location. One such is Stephen Grey, who has flown at La Ferté almost every season for 25 years. His characteristically dynamic display this time in The Fighter Collection's Corsair was



a highlight, an example of man and machine in perfect harmony — or, rather, men and machine, for one must never forget the contributions made by many other individuals to any aircraft operation. Hopefully, this month's feature on TFC will give you some idea of these 'behind the scenes' efforts, as preparations for this year's Flying Legends Air Show at Duxford on 11-12 July — another display that truly conveys the magic of aviation — gather pace.

SPECIAL ANNOUNCEMENT

At Flying Legends, we will also be unveiling an exciting new look and direction for this magazine, again with our wish to express our love of aviation at the forefront. *Aircraft* will be the classic aviation magazine for a new era, offering a contemporary take on the greatest years of aviation, the glory days of charismatic aircraft. We'll also be expanding our renowned airshow coverage. Planned features in the August issue will include an exclusive report, with stunning air-to-air, on Vintage Wings of Canada's gorgeous 'Hawk One' Sabre, a fascinating interview with former Harrier test pilot John Farley, a focus on the changing vintage aircraft scene at La Ferté Alais, and memories of RAF Wattisham's

Phantom years. Read all this and more in *Aircraft*, your new classic aviation magazine, next month... and do come to our stand at Flying Legends, where we'll be launching our new look between 11.00 and 12.00hrs on both days as well as running some exclusive competitions. I look forward to seeing you there!

Ben Dunnell
Editor



Romanian Air Force today

words & photography:
Marnix Sap
and
Carlo Brummer/MIAS



A pair of air defence MiG-21 Lancer Cs, distinguishable by virtue of their three-tone white/grey livery and black-painted radomes, from Baza 86 Aeriană at Borcea-Fetești.

An in-depth look at Romanian air power after two decades of change and five years of NATO membership



Since the demise of the Ceausescu regime in December 1989, Romania has emerged from being a communist dictatorship and is now a well-respected NATO and EU member. Its commitment to international peacekeeping missions and participation in many NATO, Partnership for Peace and bilateral exercises has illustrated Romania's ambition to be an active partner, and the Romanian AF (RoAF, or Forțele Aeriene Române) has likewise been evolving.

Romania became the first East European country to join the Partnership for Peace (PfP) programme, on 26 January 1994. A decade later, on 29 March 2004, it became a member of NATO. As a result of clever decision-making by Romania's political and military leadership, the RoAF has been transformed into a well-trained and modern air arm. However, it has reached the point at which new, modern aircraft are needed to replace the RoAF's weary transports and fighters.



Both the Borcea-Fetești-based MiG-21 squadrons operate two-seat MiG-21 LanceR Bs. Wearing the same camouflage as the LanceR A, the trainer derivative has a single multi-function display in the cockpit.

MiG-21 modernisation

Romanian foreign policy since the 1990s has clearly been focused on joining NATO, which meant that its equipment had to be compatible with Western technology. As Romania did not have the financial means to acquire new aircraft, the government realised it was left with one option, and that was to upgrade its existing fleet.

After encountering increasing problems acquiring spare parts for its MiG-29 force, the RoAF decided to invest in the upgrade of the most numerous fighter in its inventory, the MiG-21, of which over 200 were still around in 1990. The tender was issued in 1992 and, after a competitive process, Elbit of Israel was awarded the contract to become the systems integrator. The process was originally dubbed the 'DD programme' in tribute to the Romanian poet Doru Davidovici who was a MiG-21 pilot and was killed in the crash of a MiG-21UM trainer, but was later re-named LanceR, written as LanceR with a capital 'R' to underline its Romanian origins.

Low-houred MiG-21M and MiG-21MF airframes were selected for the upgrade and the US\$300-million contract initially included 75 LanceR A air-to-ground conversions, 25 LanceR C air-to-air versions and 10 LanceR B trainers. The number of LanceR Bs was later increased to 14 while the LanceR A requirement decreased to 71. One additional MiG-21MF was converted to LanceR C standard as a replacement for a jet that crashed while on test with Aerostar.

Every LanceR that has been delivered was not only stripped down but also completely overhauled before the upgrade process started. This took an average of five months per aircraft, the biggest challenge being to bring them to the same standard. Not only did the engines

of the different types vary, including the Tumansky R-11 and R-13 and Gavrilov R-25, but the various MiG-21 sub-types even differ in several ways, for instance in respect of the wiring in their wings and their internal structures.

The LanceR A prototype flew for the first time on 22 August 1995. A total of 71 LanceR As were delivered from 1996 onwards, with the conversions being drawn from a pool of 34 MiG-21Ms, 30 MiG-21MFs and seven MiG-21MF-75s. The LanceR A is equipped with the Elta EL/M-2001B radar and has a single multi-function display (MFD) in the cockpit (plus provision for a second), which has been re-designed around the Hands on Throttle and Stick (HOTAS) system. Using the controls at his fingertips, the pilot can control all display menus, update steering points, designate targets and select aiming points.

A feature unique to the LanceR is the Elbit DASH helmet-mounted display, which made this the world's first widely-used operational aircraft to incorporate the HMD (Helmet-Mounted Display) in active service. Apart from missile aiming and target cueing functions, it can display primary flight information like airspeed, angle-of-attack and waypoints. The LanceR was also one of the very first aircraft in the world capable of using weapons of both Eastern and Western origin.

The two-seat LanceR B trainer prototype undertook its maiden flight on 6 May 1996. These jets also have a single MFD in the cockpit. This was followed by the dedicated air-to-air variant, the LanceR C, on 6 November 1996. This version carries the Elta EL/M-2032 Doppler radar which is more capable than the EL/M-2001B as installed in the LanceR A. This radar has several air-to-air and air-to ground modes

and is reportedly capable of detecting fighter-sized targets at 50-60km. It can track eight independent targets while searching for another 10. The LanceR C conversions were carried out from a pool of 25 MiG-21MF-75s and one MiG-21MF.

Modifications have been introduced to the cockpit configuration, avionics architecture and weapons systems, enabling the type to compete with much costlier fighters and make the transition to Western standards. The new avionics suite takes in a modular multi-role computer, DASH (Display And Sight Helmet), a head-up display, a multi-function display and multi-function colour display, a Hybrid Navigation System, ILS/VOR/DME, Marconi ADC (Air Data Computer), VHF/UHF radio, a radar warning receiver, chaff and flare dispensers, the Elta EL/M 2001 B range radar (on the LanceR A/B) or the Elta EL/M 2032 multi-mode radar with look-down/shoot-down capability (LanceR C), DTS, flight data recorder, a NATO-compatible IFF transponder and HOTAS.

As far as weaponry is concerned, the LanceR's underwing hardpoints were adapted to carry Eastern and Western weapon systems like the Elta EL/L-8222R ECM pod, the Rafael Litening laser designator, the Elbit/Aerostar Airborne Reconnaissance Pod and a variety of smart weapons such as the Rafael Griffin and Elbit Lizard laser-guided bombs, the Elbit Opher laser- and IR-guided bomb, dumb bombs and cluster bombs of numerous types. For air defence it can use several different air-to-air missiles such as the R-73, R-60, R-3S, R-13M, Magic II and Python-3. Finally, the LanceR can be equipped with unguided rockets carried in UB-16-57 or UB-32-57 launchers, as well as single large-calibre rockets like the S-24.



This pair of IAR-99 Standard trainers from the Air Force Application School 'Aurel Vlaicu' at Boboc includes serial 701, the first production example of the variant.

IAR-99 Soim

In 1975, the Aviation Institute (INCREST) in Bucharest started development of what would be the first jet trainer fully designed and built in Romania, intended to replace the L-29 Delfin in service with the RoAF. In 1979, funding was approved for production of the first aircraft by IRAv Craiova, and the IAR-99 prototype (S-001) made its maiden flight on 21 December 1985. The type entered series production in 1987, and 17 had been supplied by 1989. However, even if the aircraft proved to have excellent aerodynamic and handling qualities, it was left behind in its class because of its outdated avionics. A first upgrade attempt began in 1990, involving IRAv Craiova and the Texas-based Jaffe Aircraft Corporation. Unfortunately, this did not come to fruition. In 1992, a new upgrade was initiated together with IAI Lahav of Israel, bringing one aircraft to the new IAR-109 Swift standard which was intended for the RoAF and for export. This was displayed at Le Bourget in 1993, but a year later this programme too was cancelled.

Following the successful upgrade of the Romanian MiG-21 fleet, the country's Ministry of Defence awarded a contract to Avioane Craiova SA and Elbit Systems in November 2004 for the production of eight IAR-99C Soim (meaning Falcon) advanced jet trainers. The contract followed a previous order in 2001 for the upgrade of four standard IAR-99s to become lead-in fighter trainers for pilots destined to fly the MiG-21 LanceR.

Powered by a Turbomecanica-built Rolls-Royce Viper 632-41M turbojet, the IAR-99C has a tandem stepped dual-control cockpit each equipped with a Martin Baker Mk10 zero-zero ejection seat. The cockpit features HOTAS controls, and the front cockpit is equipped with one liquid crystal and one cathode ray tube MFD and a HUD with an up-front control panel (HD/UFCP). The instructor's station in the rear cockpit is fitted with two CRT multi-function displays, of which one functions as the instructor's aft station HUD monitor. Both the pilot

and instructor are equipped with the Elbit Systems DASH Display and Sight Helmet, as used by the LanceR community and a range of other fighters. The helmet slaves the on-board weapons systems to the pilot's line of sight, while the visor's display confirms when target acquisition has been achieved, and shows the HUD data.

Elbit Systems has been contracted to supply the IAR-99C's advanced avionics suite, which is similar to those of the MiG-21 and F-16 in most respects including communications, navigation and identification systems, and cockpit configuration. The avionics suite includes the data transfer unit, a unique feature that creates a virtual radar image of a real or imaginary aircraft for display to the trainee pilot in the front cockpit.

The RoAF selected the Advanced Combat Training System (ACTS), produced by Elbit Systems, to assist in the transition to the MiG-21 LanceR and other future fighter aircraft. ACTS generates a comprehensive virtual environment by combining multiple real and virtual air targets into a virtual radar image, allowing the pilot to train and gain experience in the use of radar without a radar being installed on the Soim. The modular system includes a library of dynamic scenarios that can be preloaded, and the pilots and instructor can make use of a full range of debrief options for post-mission analysis and review.

The aircraft has four 250kg hardpoints under the wings, plus a fuselage centreline external stores station. The typical store on the central station is a twin-barrel GSh-23 gun pod with 200 23mm rounds. Alternatively, a laser designator, ECM or recce pod, or a 225-litre drop tank, can be carried. The underwing hardpoints can take 250kg and 50kg bombs. Air-to-air missiles for self-defence can be installed on the outer wing pylons and include the Rafael Python 3, Vympel R-60 or the older R-3S and R-13, while the inboard pylons may carry various types of bombs or 57mm rockets.

IAR-330 SOCAT

The origins of the RoAF's most potent helicopter go back a long way. On 30 July 1974, a contract for licence production of the SA330L Puma helicopter by IAR Brasov under the IAR-330L Puma designation was signed, and the variant's first flight occurred on 22 October 1975. The standard IAR-330 Puma was licence-built in Romania from 1977 onwards, with 104 being produced. However, a need for a multi-role helicopter, able to accomplish missions in a modern battlefield environment, led the RoAF to launch the Puma 2000 programme in 1992. With the help of Elbit, the SOCAT (Optical-Electronic Reconnaissance and Anti-Armour System) helicopter was developed.

In September 1995, the RoAF signed a contract for the conversion of 24 IAR-330L Pumas to SOCAT configuration. The SOCAT upgrade resulted in a helicopter designed to accomplish ground attack missions in support of land forces, and perform battlefield reconnaissance with a real-time datalink, search and rescue, battlefield extraction and transport missions from rough terrain, day and night, with an all-weather capability.

These, of course, were not new-build helicopters but airframes that were completely converted from existing IAR-330Ls. The first IAR-330 prototype (PT1) upgraded with the SOCAT system made its maiden flight in this configuration on 26 May 1998, and on 23 October 1999 the second prototype IAR-330L (PT2), likewise updated, took to the air from IAR's Ghimbav factory airfield.

Equipped with the Nexter THL-20 20mm nose-mounted chain gun with 850 rounds, together with four LPR 57 (UB-16-57) unguided rocket launchers or eight Rafael Spike-ER guided anti-tank missiles, the SOCAT packs a serious punch. The first SOCAT was delivered to the 612th Attack Helicopter Squadron at Titu-Boteni early in 2001, but when this base was closed at the end of 2004, the fleet was moved to Otopeni.

The remaining 23 IAR-330 SOCATs are assigned to the 904th and 905th Attack Helicopter Squadrons at Otopeni.



Romanian AF

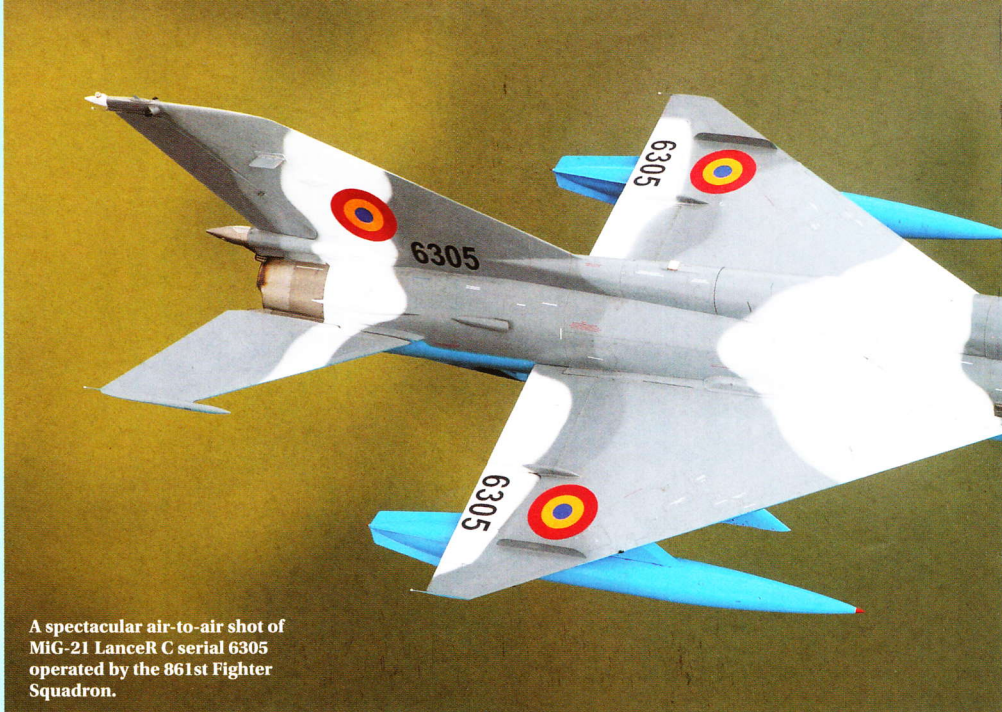
The SOCAT upgrade programme ended on 9 June 2005 when the 25th and last upgraded Puma was officially handed over to the RoAF, this being the attrition replacement for one example that became the first to be lost in a crash on 16 August 2001 when it came down shortly after take-off from Boteni-Titu. That final SOCAT was actually the original prototype that had made its first flight in SOCAT configuration on 26 May 1998. It had been retained as a development aircraft before being brought up to full operational standard prior to delivery.

As a result of its increased engagement in the Balkans, the European Union began the 'Althea' mission in Bosnia-Herzegovina on 2 December 2004, successor to NATO's SFOR commitment. On 4 January 2005, a detachment from Baza 90 consisting of 40 servicemen and four IAR-330L SOCATs left Otopeni bound for Bosnia and Herzegovina, and participation in 'Althea'. The four helicopters, stationed at the EUFOR camp at Banja Luka, were deployed not only to perform personnel and cargo airlift missions but also to provide reconnaissance, search and rescue and evacuation capabilities. 'Althea' represented the first participation by the RoAF in an operational theatre outside its own borders since WW2.

RoAF restructuring

Shortly after the fall of Nicolae Ceausescu's regime in December 1989, the Romanian AF received its current name, *Forțele Aeriene Române*, though very little changed during the first half of the 1990s other than the scrapping of large numbers of obsolete jet fighters that had been put in storage. New-build MiG-29s were delivered from Russia, and in June 1995 the air arm's Communist-era regimental system was changed into an organisation consisting of Air Bases, Groups and Squadrons.

Tactical fighter units were designated Baza Aeriană de Aviație Vânătoare și Vânătoare Bombardament (Fighter and Fighter Bomber Air Base), these assuming control of all assets including the Grupul Aviație Vânătoare (Fighter Air Group), each with one or two Escadrila (squadrons) assigned to it. Fighter-bomber units were designated Baza Aeriană de Aviație Vânătoare Bombardament for the base and Grupul Aviație de Vânătoare-Bombardament for the group.



A spectacular air-to-air shot of MiG-21 LanceR C serial 6305 operated by the 861st Fighter Squadron.

CURRENT FORCE

Romania currently has five active air bases at Câmpia Turzii, Borcea-Fetesti, Bucuresti-Otopeni, Bacau and Boboc. The air force also maintains two reserve bases, from which single helicopter squadrons are operated.

Baza 71 Aeriană: Câmpia Turzii

The current structure of the 71st Air Base at Câmpia Turzii, home to MiG-21s since June 1987 (when the 71st Fighter Regiment moved in from Caracal-Deveselu) and upgraded MiG-21 LanceRs from January 2001, was created on 1 June 2002 as a result of the Romanian Armed Forces' Reorganisation Programme. As a result, it absorbed all the aircraft and personnel of Baza 93 Aeriană at Timisoara-Giarmata, as well as those of the 58th Helicopter Base at Sibiu. The last three MiG-23MF/UB 'Floggers' previously assigned to Baza 93 Aeriană were retired in early 2002, and the base was eventually closed in August 2004 with the unit's MiG-21 LanceRs moving to Câmpia Turzii.

The two fighter squadrons at Baza 71 Aeriană are the 711th Fighter Squadron, operating a mix of MiG-21 LanceR A and B models, and the 712th Fighter Squadron, which utilises LanceR B and Cs. The latter provided four LanceR Cs for the 'Baltica 07' mission, Romania's contribution to NATO's multi-national Baltic Air Policing initiative. The jets were deployed to Šiauliai AB, Lithuania from August-November 2007. It is likely that the RoAF will perform this mission again, probably in three or four years' time.

All three MiG-21 LanceR variants in service with Baza 86 Aeriană are represented here — from the bottom, two LanceR Cs, a LanceR A and a LanceR B.



Câmpia Turzii also houses the 713th Helicopter Squadron operating the IAR-330L and IAR-330M Puma. The 714th Helicopter Squadron reports to Baza 71 Aeriană too, but flies its IAR-330Ls out of Timisoara Airport. The 71st Air Base received the first of eight modernised IAR-330Ms, a version known as the NATO Puma, at the end of 2008. These are similar to the existing SOCATs, with a few items including the nose-mounted stabilised EOP (Electro-Optical Pod) with FLIR, laser range-finder, the two anti-tank missile pylons with four rocket launchers and the 20mm GIAT turreted gun being omitted. Eight of the 12 NATO Pumas were assigned to the 71st Air Base, the remainder being stationed at Otopeni.



Two-seat MiG-21 LanceR B serial 9526 from Baza 86 Aeriană has often represented the RoAF at international air shows, hence the small 'Romania' marking on its fuselage sides.



Baza 86 Aeriană: Borcea-Fetești

The MiG-21s based at Borcea-Fetești were in the vanguard of the RoAF's transformation, when in 1997 one squadron of MiG-21MFs underwent intensive training to enable joint missions with NATO Partnership for Peace forces. The base has since undergone numerous organisational changes, firstly, in 2000, incorporating the 38th Reconnaissance Squadron with its MiG-21s, Hong-5s and An-30s, plus radar and air defence units; the recce unit was disbanded in 2001, and the former 57th Air Base Helicopter Squadron moved in during 2003.

The current structure includes the 861st Fighter Squadron, flying the MiG-21 LanceR B and C for air defence and air policing, and the 862nd Fighter Squadron

operating the MiG-21 LanceR A and B and dedicated to ground attack missions. Also reporting to Baza 86 Aeriană is the 863rd Helicopter Squadron, operating a handful of IAR-330L Pumas out of Mihail Kogălniceanu Airport, which used to be the 57th Air Base.

Since 2001, the average number of flight hours per pilot per year has increased noticeably, from 80 to 120 hours in 2007. A big part of this is down to maintaining NATO standards of readiness, and participation in multi-national exercises such as the NATO Partnership for Peace 'Co-operative Key' series. Borcea-Fetești has also hosted many bi-lateral exchanges back home. It trained with the French AF during the 'Volfac' exercises held between 1998 and 2001, and the 'Chasseur



Accompli' series from 2003 to 2006. Other exercises have been staged with the Royal Air Force — in 2003, 'Lone Kite' (with RAF Harriers), in 2004 'Lone Cheetah' (Jaguars) and in 2005 'Lone Fiol' (Tornados) were all held at the base. Meanwhile, 2007 saw USAF F-15Es from the 48th FW at RAF Lakenheath visiting for 'Sniper Lance'.



Above: The RoAF's ex-Italian AF C-130H Hercules, delivered in February 2007, is now serialled 6191.



Left: Now unique in RoAF service is An-30 serial 1105, operated primarily on Open Skies monitoring flights by the 902nd Transport and Reconnaissance Squadron.

Below: A neat trio of Puma variants on the strength of Baza 90 Transport Aerial's component squadrons, comprising a medevac IAR-330L, a standard transport IAR-330L and an IAR-330 SOCAT.

Bottom: An IAR-330 SOCAT shows its teeth. Here, the multi-role helicopter is carrying four LPR 57 (UB-16-57) unguided rocket launchers along with its standard Nexter THL-20 20mm nose-mounted chain gun with 850 rounds.

Baza 90 Transport Aerial: Bucuresti-Otopeni

RoAF transports have been based at Bucuresti-Otopeni for 60 years. On 25 October 1995, a major decision in relation to the airlift fleet was taken with the purchase of two C-130B Hercules, which doubled Romania's air transport capability and tactical range. Romania was the first former Warsaw Pact member to operate the Hercules, and four ex-USAF C-130Bs were delivered with the first two landing at Otopeni on 23 October 1996, followed by another pair, the subject of a second purchase, on 16 February 1997.

Romania's Parliament declared in 2001 that participation in peacekeeping, humanitarian and counter-terrorism operations was a major goal of the country's security and defence policy. In 2004, Romania demonstrated its international commitment by performing 216 missions (totalling 1,428 flight hours) with its C-130Bs in theatres like Iraq and Afghanistan. In support of Operation 'Enduring Freedom', the RoAF used its Hercules in support of an infantry battalion of 400 troops and a 70-strong nuclear, biological and chemical warfare company stationed at Kandahar, while maintaining a regular 'air bridge' between Romania and Afghanistan. During early 2005, the RoAF also contracted out its C-130 fleet to the Hungarian Minister of Defence for flights between Budapest and Kabul. Adding to the tempo of operations was the EU's 'Althea 2005' commitment in Bosnia-Herzegovina.

Reinforcement arrived on 14 February 2007, when Romania's fifth Hercules was delivered to the 90th Airlift Base, this being the RoAF's first C-130H. It was bought from the Italian AF on 24 June 2004 and had subsequently been sent to Lockheed Martin's Aircraft & Logistic Center at Greenville, North Carolina, in order to receive depot-level maintenance and modernisation of its communication and navigation systems.

The purchase was part of a US Department of Defense-sponsored agreement that also included an upgrade programme for the four C-130Bs, enabling



Romania to bolster its strategic airlift capability as part of its allocation of forces to NATO. The upgrade and sustainment phase for the four RoAF C-130Bs is to include such things as avionics updates, spares, technical support, contractor logistic support, ground support equipment, new T56 engines and propellers. New equipment such as UHF and VHF comms devices, crew intercoms, cockpit voice recorders, emergency locator beacons and Combined Radio Altitude Altimeters will be fitted. All subsequent avionics upgrades will be carried out in Romania using kits from Lockheed Martin. This work will bring all of Romania's Hercules up to the same C-130H configuration.

The RoAF's four remaining Antonov An-26 'Curls' and sole An-30 'Clank' are assigned to the 902nd Transport and Reconnaissance Squadron. The An-24 'Coke' was retired on 26 July 2007, when a commemorative flight over Otopeni marked the type's last mission in RoAF service. The quartet of An-26s are the sole survivors of around 14 received in the early 1970s, while the solitary An-30, one of three taken on charge in December 1976 for photo reconnaissance and aerial mapping tasks, is mainly tasked with executing Open Skies monitoring missions, Romania being a signatory state.

The RoAF's airlift capability will be further bolstered when the service starts receiving the Alenia C-27J Spartan. The type was selected in November 2006 to replace the An-24/26s, which have become increasingly expensive to operate as their service lives expire rapidly, and are not compatible with NATO operating requirements. A tender was organized by Romtehnica, with Alenia being selected to meet the seven-aircraft requirement. However, the tendering procedures were disputed by the other participant, EADS CASA, which had offered the C-295. Alenia's initial win was consequently overturned by the national authority responsible for supervising public procurement deals.

Both the government and Alenia took the decision to court, and in June 2007 it ruled that Alenia had the right to deliver the aircraft. In December 2007, Romtehnica (a company reporting to the Ministry of Defence) and Alenia Aeronautica finally signed a contract for the acquisition of seven C-27Js. An initial delivery was scheduled to take place at the end of 2008, with the arrival of the remaining aircraft spread over the following five years. However, the timescale has slipped.



The 951st Fighter Squadron at Bacau flies the MiG-21 LanceR A in the ground attack and close air support roles.

As a result of the closure of Titu-Boteni, the 61st Attack Helicopter Regiment was transferred to the 90th Airlift Base in October 2004, its inventory consisting of 24 IAR-330 SOCATs in two squadrons. There they joined the 903rd Transport Helicopter Squadron, which operates the IAR-330L Puma and the IAR-330M NATO Puma for transport duties and search and rescue. Two helicopters are generally kept on a 45-minute alert for SAR taskings. The squadron played an important role during the Romanian floods in 2005 and 2006, during which four Pumas (one SAR and three transport versions) were deployed for SAR, winching, supply and evacuation missions.

Baza 95 Aeriană: Bacau

The 95th Air Base was created on 25 August 1995, its purpose being to support the 95th Fighter Group, which had become responsible for training RoAF MiG-21 pilots. It also supported the Aerostar company's co-located MiG-21 LanceR test activities. 25 March 1997 saw delivery to the unit, which was declared fully operational on 8 May that year, of the first LanceR. Resulting from yet another reorganisation process, from 1 May 2001 until 1 July 2004, Bacau was home to Centrul 95 Trecere pe Avioane Supersonice (the 95th Centre for Transition to Supersonic Aircraft), the MiG-21 LanceR conversion unit. Since 1 July 2004, though, it has taken on the

more conventional Baza 95 Aeriană designation. The training task was transferred to the 205th Fighter Squadron, a dedicated training outfit that still operates some MiG-21 LanceR Bs from Bacau, but which is subordinated to the Școala de Aplicație pentru Forțele Aeriene 'Aurel Vlaicu' (Application School for the Air Force named after Aurel Vlaicu, the great Romanian aviation pioneer) at Boboc.

The current structure of Baza 95 Aeriană incorporates the 951st Fighter Squadron operating both the MiG-21 LanceR A and B for ground attack and close air support missions and the 952nd Helicopter Squadron using IAR-330L Pumas for medevac, SAR, airlift and



MiG-21 LanceR A serial 8107 comes in over the threshold at Bacau.

Romanian AF

reconnaissance tasks. The latter also provides operational medevac training to the RoAF's other IAR-330 units.

Helicopters arrived at Bacau in the form of Alouette IIIs and Pumas after Grupul 59 Elicoptere at Tuzla and Grupul 60 Elicoptere at Tecuci were disbanded in 2001 and these bases subsequently closed. The Alouette IIIs have since been retired from operational service, and only the training school at Boboc operates a handful. During the 2005 floods, IAR-330s from Bacau rescued over 500 people and delivered over 200 tonnes of medical supplies to the affected area of Comanesti.

Reserve air bases

The first of the RoAF's two reserve bases is Mihail Kogălniceanu Airport near Constanta. This is the former Baza 57 Aeriană, from where, in its active days, two squadrons of MiG-29 'Fulcrums' were located. The first pairs of single-seat MiG-29s and two-seat MiG-29UBs were delivered to Romania shortly before the 1989 revolution, but training flights did not start before March 1990. Initially, 14 MiG-29s and four MiG-29UBs were supplied, but later an additional two single-seaters were received to replace attrition losses, and in 1992 a single MiG-29 'Fulcrum-C' was received from the Moldovan AF.

The 'Fulcrum' was operated until early 2003 when it was decided to withdraw the type from service. One squadron temporarily operated eight LanceR As and a LanceR B until April 2004, when Baza 57 Aeriană was disbanded, with the LanceRs returning to Borcea-Fețești. The base is now an annex of Baza 86 Aeriană. In 2000, Aerostar and Elbit launched the Sniper programme as an upgrade package for the MiG-29. Although plans existed to upgrade at least 12 RoAF 'Fulcrums', the Romanian government announced the final retirement of the type in January 2003 and the aircraft remain in storage at Mihail Kogălniceanu Airport.

The other reserve base is Timișoara-Giarmata, home to the 714th Helicopter Squadron and its IAR-330L Pumas. Assigned to Baza 71 Aeriană at Câmpia Turzii, the Pumas now reside at the former Baza 93 Aeriană, the last airfield in Romania from where MiG-23 operations took place. Only four 'Floggers' were operational as of the year 2000, and the final MiG-23 sortie was flown in September 2001, after which the squadron was disbanded. The RoAF's reorganisation process did not yield a new mission for the base, and the 93rd Air Base was finally disbanded in August 2004.



Air Force Application School 'Aurel Vlaicu'

Numerous changes have swept through the RoAF flying training syllabus over the two decades since the fall of Communism. On 1 August 2004, the Școala de Aplicație pentru Forțele Aeriene, or Air Force Application School (AFAS), was established, providing training for pilots and also personnel engaged in the artillery, ground-to-

air missile and radar branches. Today, the 'Aurel Vlaicu' Flight School consists of five units — the 201st School Squadron operating the IAK-52, the 202nd School Squadron flying Antonov An-2 'Colts', the 203rd School Squadron with IAR-99s, the 204th School Squadron on the IAR-99 Soim, and finally the 206th School Squadron which uses the RoAF's last five IAR-316B Alouette IIIs.

Left, top to bottom:

The first aircraft experienced by a trainee RoAF pilot is the Romanian-built IAK-52.

A quartet of IAR-99s gets down to low level near their base at Boboc.

A small number of venerable An-2s are kept on strength by the RoAF in order to train pilots destined for the transport community.

Right: Helicopter training is undertaken on the RoAF's five remaining IAR-316B Alouette IIIs.



Because of problems with the runway, AFAS jet training has only recently returned to the unit's home base at Boboc. During 2003 and 2004, Ianca was used, until this base was closed and the IAR-99s had to move to Bacau. The L-29 Delfin was finally retired in 2005, at which point only a small number of L-39ZA Albatros were being used besides the IAR-99s. September 2007 saw completion of the runway and infrastructure work at Boboc, allowing the IAR-99s and L-39s to return home and rejoin the other AFAS training squadrons.

Until 2006, the course at the RoAF Academy, named after Henri Coanda, lasted four years, but this has been changed to three years in line with international norms. During the summer after the first year's studies, the students selected to become pilots are sent to the AFAS. There they attend theory classes on aeronautical subjects and fly the IAK-52. Following an agreement between the

governments of Romania and the USSR, it was decided to manufacture the Yak-52 in Romania in large numbers, but except for the USSR's DOSAAF paramilitary sport flying organisation, the only customer for the Yak-52 in the 1980s was the RoAF, which introduced the aircraft at the beginning of 1986 as the IAK-52. Since then, several more air arms and many hundreds of civilian buyers have purchased the type; now, more than 20 years since production started, the Romanian manufacturer Aerostar has made more than 1,800 Yak-52s.

In the course of 50 to 60 hours on the IAK-52, including basic training, navigation, formation and solo flights, each student's flying skills are assessed. After the first year, it is decided if the pilot will become a fighter pilot and continue on the IAR-99. If not, they can move across to the transport community and train on the An-2, or to helicopters for

which the IAR-316 is used. This decision is based on the student's performance, their own flying interests and of course the RoAF's requirement for pilots. After a second year at the Academy the trainee fighter pilot returns to Boboc for 50 more flying hours. Basic training is given on the standard IAR-99, taking in navigation, formation and instrument training, and finally solo flights. This is continued in the third year, where the focus is more on formation and aerobatics.

After graduation from the Academy, the cadet becomes a first lieutenant and begins flying the IAR-99C Soim. From 2008 onwards, with the retirement of the L-39ZA, all students have received their advanced pilot training on the IAR-99C Soim. The 204th School Squadron now has nine such aircraft in its inventory. ▲

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LanceR replacement

As the MiG-21 LanceR fleet is becoming increasingly more expensive to operate, and to enable greater interoperability and compatibility with NATO, in 2007 the RoAF expressed its intention to replace them from 2010-11 onwards with a new fleet of at least 40 single-seat multi-role fighters and four two-seat conversion trainers, with candidates including the Eurofighter Typhoon, Lockheed Martin F-16 and Saab Gripen. The deal is expected to be worth €4.5 billion including training and initial logistics support.

However, no official announcement has yet been made on any tender process. Discussions in Romania continue, attempting to ascertain whether this purchase will be conducted through a tender or through a 'competitive dialogue', as Romanian law allows for both options.

As usual, competition is fierce. Eurofighter has indicated that it can satisfy the programme requirements within the allocated budget and deliver a requested 80 per cent offset package for local industry, including a Romanian assembly line and the ability to perform maintenance support and upgrades. Offering 24 Typhoons, the first operational squadron could start to form in 2010 with the remaining aircraft being delivered in the 2010-2014 period. The manufacturer has already assessed the technical capabilities of Avioane Craiova and is known to be evaluating Aerostar at Bacau. Eurofighter has also indicated that it can rapidly present a new proposal to supply Romania

with refurbished and upgraded second-hand Typhoons if the defence ministry is forced to change its programme requirements, which could also include a leasing agreement.

Ahead of a possible tender or competitive dialogue, the US Defense Security Co-operation Agency (DSCA) notified Congress in May 2008 of a possible Foreign Military Sale (FMS) to Romania of 48 F-16C/Ds, potentially consisting of 24 Block 50/52 jets with either the F100-PW-229 or F110-GE-129 Increased Performance Engines (IPE) and APG-68(V)9 radars as well as 24 refurbished and upgraded Block 25 aircraft being provided as Excess Defense Articles with F100-PW-220 Increased Performance Engines (IPE) and APG-68(V)1 radars. An F-16 sale to Romania would also include associated equipment such as 12 AN/AAQ-33 Sniper or AN/AAQ-28 Litening targeting pods, four Tactical Air Reconnaissance Systems or DB-110 recce pods, IFF and EW systems and self-protection equipment.

Saab is also actively marketing the Gripen, offering the Gripen NG as well as refurbished second-hand aircraft. Similar to other companies, Saab is investigating which Romanian companies could become involved in a Gripen offset programme.

Amidst a global economic crisis, a decision is not expected in the short term. Nevertheless, with several impressive upgrade programmes and reorganisation efforts already having been realised, the Romanian AF is very well prepared for the procurement of any new multi-role aircraft.