

# Fortele Aeriene Romane

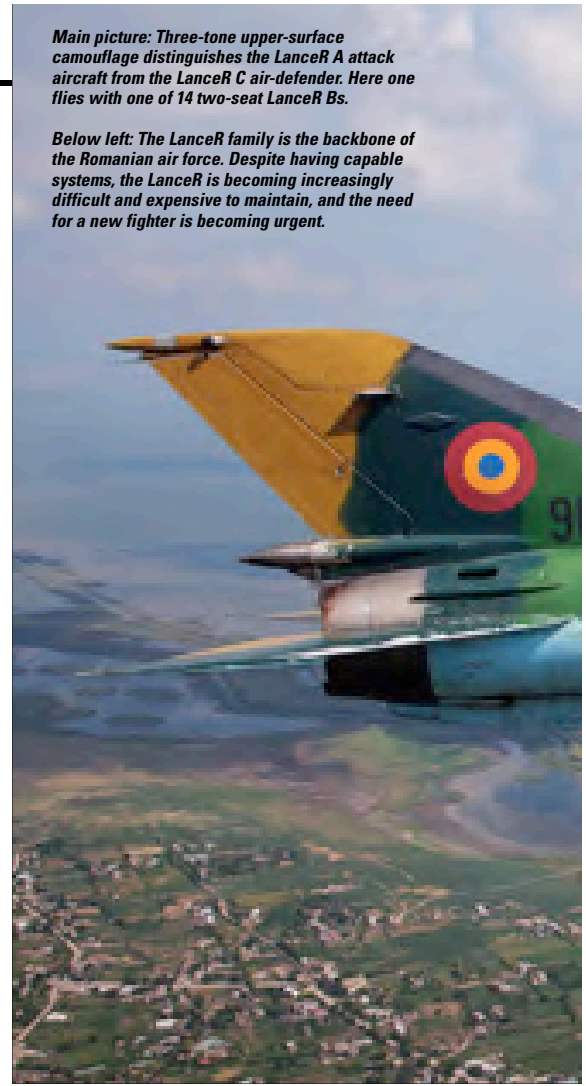
Since its emergence from the Communist era, Romania has joined NATO and become an important partner in the alliance's activities. The air force is still in a period of transformation, which will only be completed when new fighters are purchased.



Since the demise of the Ceausescu regime in December 1989, Romania has emerged from being a communist dictatorship to a well-respected and integrated member of NATO and the European Union. Its commitment to a manifold of international peacekeeping missions and participation in many NATO Partnership for Peace and bilateral exercises clearly illustrates Romania's ambition to not only be a trusty partner to NATO and Europe, but to be an integral part of it.

The first steps towards reaching this goal were taken when Romania joined the Partnership for Peace (PfP) programme on 26 January 1994, being the first former eastern European country to do so. Ten years later, Romania joined the North Atlantic Treaty Organization (NATO) on 29 March 2004, the same day that Estonia, Latvia, Lithuania, Slovenia, Slovakia and Bulgaria acceded to the alliance.

As a result of clever decision-making by Romania's political and military leadership, the



*Main picture: Three-tone upper-surface camouflage distinguishes the LanceR A attack aircraft from the LanceR C air-defender. Here one flies with one of 14 two-seat LanceR Bs.*

*Below left: The LanceR family is the backbone of the Romanian air force. Despite having capable systems, the LanceR is becoming increasingly difficult and expensive to maintain, and the need for a new fighter is becoming urgent.*

Air Force has been transformed into a well-trained and modern air arm allowing for a smooth transition into the new millennium. Making use of Israeli technology, an impressive upgrade of a substantial part of its large MiG-21 fleet was successfully completed, while applying the same advanced technology helped create the indigenous IAR-99C Soim that is now arguably the most modern European jet trainer in operational service. Technology also transformed a portion of the licence-built Puma fleet into the formidable IAR-330 SOCAT attack helicopter.

However, with five active airbases remaining, the Romanian Air Force has reached the point that, after years of continuous restructuring and optimisation of its forces, new modern aircraft are needed to replace the fleet of weary transport aircraft and fighters.

With the delivery of the first of seven ordered C-27 Spartans as a replacement for the An-24 and An-26 imminent, strategic airlift is receiving the necessary boost as it is considered one of the emerging areas of specialisation in Romania's military. The long-awaited decision over which multi-role fighter aircraft will be replacing the current fleet of MiG-21 Lancers is now

*Apart from a few Alouette IIIs surviving in the training role, the FAR's rotary-wing requirements are met entirely by versions of the IAR-330 Puma. This example is configured for the air ambulance mission.*



*Right: There are still reminders of Romania's Communist past, such as the handful of Antonov An-2s in FAR service. The 'Annushka' is used in the training role for transport pilots.*

temporarily shelved as the global economic crisis has hit Romania.

### Birth of an air force

Romania has a rich and colourful history in the field of aviation. It is one of the few countries in the world to have indigenously designed, built and flown various types of aircraft. Romania's aviation history began as far back as 1529 with the work of Conrad Haas, who is seen as the father of the multi-stage rocket as he wrote about the construction of such concepts and tested many models in flight. In 1893 a balloon observation unit was established under the 1st Telegraphy Command within the 1st Engineers Regiment, as the first military air unit of the Romanian Army.

More aviation history was written when Henry Coanda built the world's first jet aircraft, named the Coanda-1910. He tested his engine near Paris and showed it at the 1910 International Aeronautical Show in Paris. Unfortunately, the first jet flight itself ended in a crash when, on 16 December that year, the aircraft slipped, fell and burned out. Unknown to most, Coanda took over the technical management of the Bristol aircraft factories in the



United Kingdom in 1911 and became the constructor of the first twin-engined aircraft in the history of aviation.

Another famous Romanian Aviation pioneer was Aurel Vlaicu, who constructed the first propelled aircraft to be entirely built in Romania. He had learned to fly himself and took off for the first time on 17 June 1910. Nowadays this day is celebrated as the birthday of the Romanian Air Force. The autumn of 1910 saw the beginning of the military use of aviation, at the occasion of the Royal manoeuvres, which put Romania in second place (after France) in the use of the aeroplane for military purposes.

On 1 April 1913 the Romanian Parliament began structuring laws for military aviation, thereby paving the way for the Air Force as an independent branch. Romania became the fifth nation in the world to have an independent Air Force (albeit part of the Army's Engineers Command). The Romanian Air Force had at least 18 aircraft in the Second Balkan War (June-August 1913) and on 15 August 1915 the Romanian Flying Corps - 305 Corpul Aerian Roman - was established with three groups and a squadron for special missions. The Corps performed air reconnaissance missions during World War I and even won several victories



**Romania has built up a sizeable and capable transport fleet, of which the Lockheed C-130 Hercules is the backbone. All of the Hercules have been upgraded to an equivalent C-130H standard.**

against the German Luftwaffe, but finally disintegrated as the country was overrun by Austro-German forces.

After the war, a new air arm was established in 1918, named the Divizia 1 Aeriana (1st Air Division), reporting to the Directorate of Army Aviation. There was a significant influx of Romanian aircraft coming from the production lines as seven Romanian aircraft factories - Aeronautic Arsenal, SET and ICAR in Bucharest, STC in Constanta, ASTRA in Arad, Schiell and IAR in Brasov - produced more than 2,000 military and civil aircraft in 80 different models, employing great numbers of engineers and technicians.

During World War II, Romania first sided with Germany and its Axis allies when the country became a part of the Axis Tripartite Pact in November 1940. Many of its aircraft, however, were obsolete at the start of the war but, with German help, the air force was able to re-organise itself as the Forțele Aeriene Regale ale României (Royal Romanian Air Force), flying aircraft of German and Italian design such as the Focke-Wulf Fw 190, Junkers Ju 87, Heinkel He 111, Messerschmitt Bf 109, Savoia-Marchetti SM. 62 and SM.79, as well as indigenously-built aircraft, such as the IAR 37 and 80.

The Royal Romanian Air Force fought against the Magyar Királyi Honvéd Légierő (Hungarian Air Force) during the Hungarian annexation of Transylvania, while fighting alongside the German Luftwaffe during the advance into the Ukraine and Crimea. It also carried out some reconnaissance and patrol missions over the Black Sea alongside Bulgarian units.

The Royal Romanian Air Force was also tasked with the air defence of the Ploiesti oil installations, the city of Bucharest against Allied air raids, and to protect Axis convoys in the Black Sea, fighting against the USAAF and RAF during their raids against Romania. The anti-fascist *coup*

*d'état* led by King Michael I on 23 August 1944 took the Germans completely by surprise and attempts were made to move German troops into Bucharest by air, but as the Romanians held all the serviceable airfields, the operation was cancelled. The country swapped sides, with Romanian forces joining the Allied powers and spending the rest of the war fighting for the liberation of Transylvania, Hungary, Czechoslovakia and Austria.

#### Post-war air force

In 1946, the prefix 'Royal' was dropped and the Forțele Aeriene ale Republicii Populare Române (People's Republic of Romania Air Force) was reorganised following the Soviet occupation of Romania. It was structured along Soviet lines with regiments instead of flotillas.

In 1950 new Soviet aircraft were introduced such as the Iak (Yak)-18, Po-2, La-9, Tu-2 and Il-10. In 1951 eight regiments (Regimentul Aviatie de Vanatoare Reactie) were established under the command of three divisions (Divizia Aviatie de Vanatoare Reactie), together with some support and training regiments. Some 77 Iak-17s and Iak-23s were added to the air force inventory and, in 1952, another 88 aircraft arrived in the form of MiG-15, MiG-15bis and Avia S-102s (Czech-built MiG-15s).

Three years after Romania became a member of the Warsaw Pact in 1955, Soviet troops left. At this point the Romanian Military Air Force Command included five air divisions and one technical division: the 97th Air Division, 23rd and 66th Fighter Divisions, 68th Air Strike Division, 87th Air Mixed Division and 34th Technical Division. The official designation of the air force was changed to Aviatia Militara (Military Aviation) and, in 1956, the Territorial Air Defence Command was established as a result of a new restructuring process ordered by the Soviets, which was operated until May 1977. In 1958, the first supersonic fighter - the MiG-19 - entered service, followed four years later by MiG-21F-13s. In 1956 the first helicopter unit was established, flying four Soviet-made Mil

Mi-4s and, from 1962 onwards, the PZL-Swidnik SM-2, a larger Polish-built variant of the Mi-1.

#### Resurgent industry

In the 1960s and 1970s, Romania managed to restore its military aviation industry to its pre-World War II position as one of the few countries having a national aviation industry. It obtained licences for the production of some Western types. The Soviet Union cooperated to an extent, but also tried to confine Romania to producing relatively unsophisticated aircraft at a lower level of aviation technology. Following the Soviet invasion of Czechoslovakia in 1968, Romania tried to distance itself from the Soviet Union and aligned itself with Czechoslovakia and Yugoslavia. Romania also established extensive ties with several Western and non-Warsaw Pact countries, undertaking licensed production of foreign aircraft. The Britten-Norman BN-2 Islander and BAC 1-11 airliner, Aérospatiale SA 316B Alouette III and SA 330H/L Puma helicopters were all built under license in Romania.

A major development and production project for Romania's aviation industry was the YUROM project, in which Yugoslavia and Romania cooperated in developing and manufacturing the IAR-93/J-22 Orao fighter-bomber, the only non-Soviet jet fighter ever built and flown in the air force of a Warsaw Pact member state.

The Romanian single-seat prototype made its first flight on 31 October 1974 at Bacau (simultaneously with the Yugoslav prototype at Batajnica Air Base) and during the early 1980s, the 67th Fighter-Bomber Regiment and 49th Fighter-Bomber Regiment from Craiova and Ianca, respectively, were equipped with the new IAR-93 attack aircraft to replace aging MiG-15s and MiG-17s.

As of 1989, the Air Force had approximately 32,000 personnel under its command, of which fewer than one third were conscripts. With an inventory of some 512 combat aircraft, its primary mission was protecting and supporting Romania's ground forces and defending the country against a possible invasion by providing

*The Antonov An-26 served the FAR well for many years, and a few remain in use for tactical transport duties. As with other Soviet-supplied aircraft, they are in desperate need of replacement, which will shortly arrive in the form of the Alenia C-27J.*

transport, reconnaissance and helicopters assets to the battle. Divided into three tactical divisions, each division was composed of two regiments each with two or three squadrons of interceptors and one squadron of ground-attack aircraft, operating mainly Soviet-made MiG-21s and MiG-23s, but some MiG-15s were still available as well as a large number of IAR-93 Oraos.

Finally, in December 1989, just a few days before the revolution against Ceausescu's regime began, the first four MiG-29s arrived in Romania with the first training flights starting in March of 1990.

### New dawn for Romania

Shortly after the fall of the regime of Nicolae Ceausescu in December 1989, the Romanian Air Force received its current name Forțele Aeriene Române. During the first half of the 1990s very little changed other than the scrapping of large numbers of obsolete jetfighters that had been in storage. Additional new-build MiG-29 (9-12 and 9-51) 'Fulcrums' were delivered from Russia, and in June 1995 the Communist-era regimental system was changed into a structure consisting of air bases, groups and squadrons.

Tactical fighter units were designated as Baza Aeriana de Aviație Vanatoare și Vanatoare Bombardament (fighter and fighter-bomber air base), in control of all assets including the Grupul Aviație Vanatoare (fighter air group) with one or two Escadrila (squadrons) assigned to it. Fighter-bomber units were designated as Baza Aeriana de Aviație Vanatoare Bombardament for the base, and Grupul Aviație de Vanatoare-Bombardament for the group.

Romania was the first eastern European country to join the Partnership for Peace (PfP) programme on 26 January 1994. Ten years later, Romania joined the North Atlantic Treaty Organization (NATO) on 29 March 2004. The same day, the air force began air-policing missions under NATO command.

### MiG-21 fleet 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 the MiG-29 fleet, the Romanian AF decided to invest in the upgrade of the most numerous fighter in its inventory - the MiG-21 'Fishbed', of which over 200 were still around by 1990.

The tender was issued in 1992 and, after a competition in which several companies showcased their upgrade proposals, Elbit of Israel was awarded the contract to become the systems integrator. The program was originally dubbed as the 'DD' programme in tribute to the Romanian poet Doru Davidovici who had been a MiG-21

*A one-off oddity in the FAR's inventory is the Antonov An-30. Based on an An-26 airframe, the 'Clank' is outfitted for aerial survey and mapping, and is used for Open Skies duties.*





pilot killed in a crash in a MiG-21UM trainer, but was later re-named LanceR, with a capital 'R' to underline its Romanian origin.

Among the available aircraft, low-hour 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 number of LanceR As decreased by four to 71 conversions. One additional MiG-21MF was converted to LanceR C as an attrition replacement.

Every LanceR that has been delivered to the Romanian Air Force has not only been stripped down, but also completely overhauled before the process of upgrading got under way. This overhaul and upgrade process took five months per aircraft on average, with the biggest challenge being to bring them all to the same stan-

dard. Not only were there engine differences (Tumanskii R-11 and R-13, and Gavrilov R-25), but MiG-21s are even different within the subtypes (different engines harnesses, wiring within the wings and internal structure).

### LanceR takes to the air

The LanceR A is the ground attack version of the LanceR and the prototype flew for the first time on 22 August 1995. A total of 71 LanceR A aircraft was delivered to the Romanian air force from 1996 onwards, with the LanceR A conversions being drawn from a pool of 34 MiG-21Ms, 30 MiG-21MFs and seven MiG-21MF-75 aircraft.

LanceR A is equipped with the Elta EL/M-2001B radar. The cockpit has been redesigned around the Hands-On-Throttle-And-Stick (HOTAS) principle and has a single MFD in the cockpit (with provisions for a second). Using



*Left: Prospective LanceR pilots convert to type on the LanceR B two-seater. Its front cockpit is similar to that of the LanceR A attack aircraft.*

the controls at his fingertips, the pilot can control all display menus, update steering points, designate targets and select aim points. Via a PCMCIA card, mission data such as routes, targets, waypoints, frequencies and weapons details can be uploaded from the Data Transfer System (DTS). After the mission the system can be used to download data for debriefing and maintenance purposes. Another interesting feature is the onboard Video Tape Recorder (VTR), which can simultaneously tape both MFDs (LanceR C only) or one MFD and the HUD, and thus provide valuable flight data for mission debriefing and flight-testing. Besides images, the VTR also records all communication.

Another unique feature to the LanceR is the Elbit DASH helmet-mounted display, making the MiG-21 LanceR the world's first widely used operational aircraft to incorporate the HMD (helmet-mounted display system). It has been in active service since 1996. Apart from missile-aiming and target-cueing functions, the DASH can display primary flight information such as airspeed, angle-of-attack and waypoints. Helmet-mounted sights have now been in service on MiG-29s and Su-27s for some years, and but it is only now that such systems are becoming more commonplace in Western fighters. The LanceR, however, was equipped with this feature right from the start.

It was also one of the very first aircraft in the world capable to operate weapons of both Eastern and Western origin, and perform extremely accurate attacks with both 'iron' bombs and precision-guided weapons. The LanceR has demonstrated a circular-error-probability (CEP) accuracy of 7 mil/radian and below, while maintaining a one- to two-metre CEP with laser-guided weapons. The aircraft is also cleared for asymmetric loading of weapons.



**Above: Twenty-five LanceR C conversions were undertaken to equip two air defence squadrons. The aircraft defend Romanian airspace, and have also been used on the Baltic air policing detachment.**

**Right: The LanceR A is the most numerous combat type, with 71 delivered. It specialises in the delivery of precision-guided weapons.**

During the modernisation process, the Lancers were equipped with new features to improve flight safety, including support for night flight and all-weather operations with the use of more advanced navigation equipment, such as VOR/ILS, INS and ADF

### Fighters and trainers

The two-seat training version of the LanceR was dubbed LanceR B, and the prototype flew for the first time on 6 May 1996. It carries the same camouflage pattern as the LanceR A and also has a single MFD in the cockpit. The initial order for 10 LanceR B trainers was modified to 14 aircraft in the year 2000.

The dedicated air-to-air variant of the LanceR took to the air on 6 November 1996. Initially 25 conversions were ordered but, due to the crash of an example during an air test with Aerostar, one extra aircraft was converted. Named LanceR C, it carries the Elta EL/M-2032 Doppler radar, which is more capable than the Elta EL/M-2001B radar 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 ranges of 50-60 kilometres (31-37 miles). It can track eight independent targets while searching for another ten. To fully use these capabilities, a new radome had to be developed which was painted black, while the LanceR-C exterior carries a remarkable three-tone white/grey camouflage scheme.

LanceR C conversions were drawn from the pool of 25 MiG-21MF-75s and one MiG-21MF aircraft. Modifications have been introduced to the cockpit configuration, avionics architecture



and weapons systems, enabling the MiG-21 LanceR to compete with much costlier fighters and to make the transition to Western standards. The upgrade programme retained the existing airframe, which was retrofitted with an avionics suite and new weapons integrated around two MIL STD 1553B multiplex data buses, including a Modular Multi-Role Computer, DASH (display and sight helmet), HUD (head-up display), Multi-Function Display and Multifunction Colour Display, Hybrid Navigation System, ILS/VOR/DME, Marconi ADC (air data computer), VHF/ UHF radio, RWR (radar warning receiver), chaff and flare dispensers, Elta EL/M-2001B ranging radar (Lancer A/B) or Elta EL/M-2032 multi-mode radar with look-down/shoot-down capability (Lancer C), DTS (data transfer system), flight data recorder, IFF transponder (NATO Mk 10 IFF-compatible) and HOTAS.

The underwing hardpoints were adapted to carry Eastern and Western weapon systems such as the Elta EL/L-8222R electronic countermeasures pod, Rafael Litening LDP (laser designation pod), Elbit/Aerostar Airborne Reconnaissance Pod (photo reconnaissance pod) and a variety

of smart weapons such as the Rafael Griffin laser-guided bomb (LGB), Lizard LGB and Opher IR-guided bomb. Dumb bombs and duster bombs include the Mk 82, Mk 83, FAB-100, FAB-250, FAB-500, BEM-100 and CL-250. For air defence the LanceR can carry several different air-to-air missiles, such as the R-73, R-60, R-3S, R-13M, MBDA Magic II and Rafael Python 3. Finally, the LanceR can also be equipped with unguided rockets, which are carried in UB-16-57 or UB-32-57 rocket launchers, or as single large calibre rockets such as the S-24. The delivery of the last LanceR took place in April 2003.

### IAR-99 Soim

In 1975, the Aviation Institute (INCREST) in Bucharest started what would be the first jet trainer fully designed and built in Romania, intended to replace the Aero L-29 Delfin in service with the Romanian air force. In 1979 funding was approved for I.R.Av Craiova to build the first aircraft, and the IAR-99 prototype (S-001) flew on 21 December 1985. The aircraft entered series production in 1987 and by 1989 17 aircraft had been delivered to the Romanian air force.



*This well-used LanceR A displays the MiG-21's agility, which is still valued by pilots today. The Romanian upgrade brought the aircraft's ageing systems into the modern era, but the airframe is now getting tired.*

However, even if the aircraft proved to have excellent aerodynamic and handling qualities, it was left behind in its class because of the outdated onboard avionics and a first upgrade attempt was made in 1990 by I.R.Av Craiova together with Texas-based company Jaffe Aircraft Corporation. Two aircraft were modified by installing additional instrumentation, as well as some Honeywell avionics, and the aircraft was declared as an intention to enter the competition for the Joint Primary Aircraft Training System programme in the US. This, however, did not come to fruition.

### IAR-109 Swift

In 1992 a new upgrade programme was initiated together with IAI Lahav of Israel, bringing one aircraft to the new IAR-109 Swift standard. It was intended for Romanian air force service as well as for export. The aircraft was equipped with HOTAS (hands on throttle and stick) controls in both cockpits, wide-angle HUD (head-up display) with UFCP (upfront control panel) in the front cockpit, two 3-in displays in both cockpits, ring laser gyro inertial navigation system (INS), as well as the integration of both Eastern and Western weapon systems on the aircraft. The aircraft was displayed at Le Bourget in 1993, but a year later the programme was cancelled.

Following the successful upgrade of the Romanian MiG-21 fleet, the Romanian Ministry of Defence awarded a contract to Avioane Craiova SA and Elbit Systems for the production of eight IAR-99C Soim (falcon) advanced jet trainers. The contract followed a previous order for the upgrade of four IAR-99 Standard aircraft to Soim for the Romanian air force, to become the lead-in fighter trainer aircraft for those pilots destined to fly the MiG-21 LanceR. The first upgraded IAR-99C Soim was the 18th IAR-99 Standard production aircraft, which performed its first flight on 22 May 1997. The first aircraft entered operational service at Boboc for school duties on 25 October 1988.

Powered by a Turbomecanica/Rolls-Royce Viper 632-41M turbojet engine, the IAR-99C has tandem stepped dual-control cockpits, each equipped with a Martin Baker Mk 10 'zero-zero' ejection seat. The cockpit is equipped with

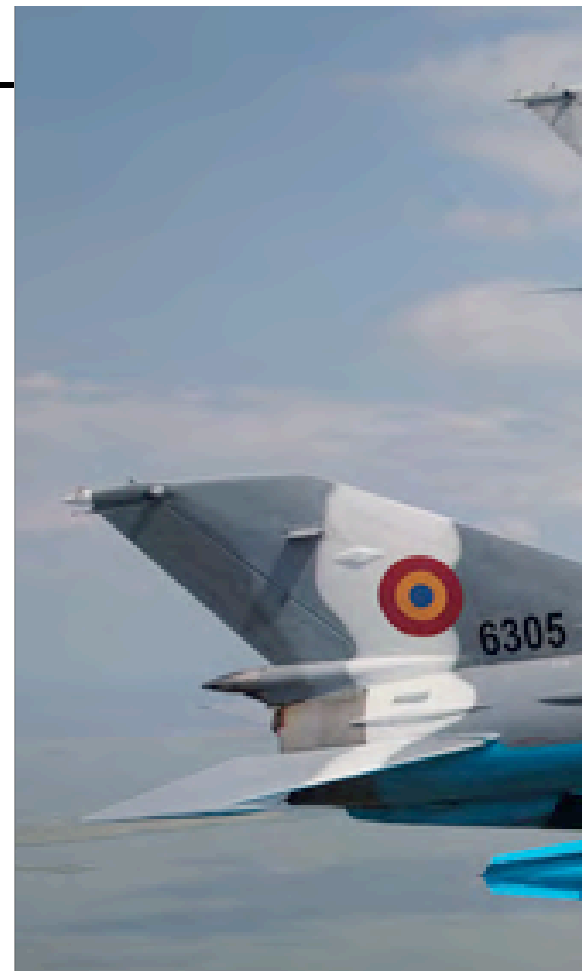
HOTAS controls and the front cockpit is equipped with one liquid crystal and one cathode ray tube multi-function display, and a head-up display with an upfront control panel (HUD/UFCP). The instructor's station in the rear cockpit is fitted with two CRT multifunction displays, of which one functions as the instructor's aft station head-up display monitor (ASHUDM). Both the pilot and the instructor are equipped with the Elbit Systems DASH display and sight helmet, which is also used by the MiG-21 LanceR community and a range of other fighter aircraft. The helmet slaves the onboard weapons systems to the pilot's line of sight. The visor's display confirms when target acquisition has been achieved. The visor also displays the data from the HUD.

### Advanced avionics

Elbit Systems had been contracted to supply the aircraft's advanced avionics suite installed on a Mil Standard 1553B data bus. The suite, including communications, navigation and identification systems, and the cockpit configuration, are similar to those of the MiG-21 LanceR and F-16 fighter aircraft.

As in the LanceR, the IAR-99 Soim is equipped with video and debriefing systems. The communication systems include VHF and UHF communications, a voice-activated intercom and an identification friend or foe transponder. The flight systems include a VOR/ILS, a VHF omni directional radio ranger linked to the instrument landing system. Other navigation tools include distance-measuring equipment (DME), an automatic direction-finder (ADF), a Northrop Grumman inertial navigation system and a Trimble global positioning system. The avionics suite includes a 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 Romanian air force has selected the Advanced Combat Training System (ACTS) produced by Elbit Systems to assist in the transition to the upgraded MiG-21 LanceR aircraft and other future fighter aircraft, and the data transfer unit operates by taking navigational data sent via a data uplink from a similar unit installed in a ground station or installed on aircraft flying nearby. 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 actually a radar being



installed in the IAR-99 Soim aircraft. The system provides efficient training in combat scenarios as close to real as it gets without the high cost of combat aircraft.

The modular system includes a library of dynamic scenarios that can be preloaded via a PCMCIA card or via an uplink initiated by an instructor located in the ground station. The choice of scenarios includes fighters, along with simulation of any infrared or radar guided missile, interceptors, air-to-air and surface-to-air missiles, anti-aircraft batteries, radars, chaff and flare countemeasures, collision warnings, in low or dense electronic warfare environments, and many other simulated or re-enactments of true-to-life combat situations.

The pilots and instructor can make use of a full range of debrief options for post-mission analysis and review. A cockpit television system connected to an airborne video tape recorder (VTR) is used to record the information displayed along the flight on the HUD. On the audio channel of the VTR, the instructor in the aft cockpit can record comments related to different events during the flight. Through a Failure Injection Panel, the instructor in the aft cockpit can simulate failures in the front cockpit.

The IAR-99 Soim electronic warfare suite is based on the Elisra Electronic Systems radar warning receiver with two of its antennas being placed on the lower sides of the forward fuselage, while the other two are placed on the sides of the fin. The radar-warning receiver detects pulse Doppler, pulse and constant working radar threats and provides threat identification by comparing signal characteristics against a threat



*Above: The LanceR C modification is arguably the most advanced MiG-21 version flying. Its Elta multi-mode radar gives it good capability in the air defence role, while the DASH helmet sight allows high off-boresight missile shots.*

*Below: A LanceR B lands at Borcea-Fetesti at the end of another training mission. The instructor in the rear seat has a periscope to provide forward vision during the approach. The LanceR B lacks radar and has no combat function.*







*Above: The FAR operated the Aero L-39 Albatros in the training role until 2007. The last surviving aircraft were of the armed L-39ZA version, but were operated in 'clean' configuration.*



*Left: The Aerostar factory has manufactured over 1,800 IAR-52s in three major versions. The aircraft is used today by the FAR for screening and primary training.*

library with the radar threats being presented in the forward cockpit on a 3-in display, placed on the right side of the Upfront Control Panel (UFCP). For protection within hostile environment, two chaff and flare dispensers (placed on the trailing edge of the horizontal stabiliser, between the elevators), are used for passive jamming, while for active jamming an ECM (electronic countermeasures) pod can be installed under the fuselage. These systems are integrated through the Military Standard 1553 data bus.

The aircraft has four 250-kg hardpoints under the wings, plus a fuselage centreline external stores station. The typical store under the central station is a GSh-23 twin-barrelled gun pod with 200 23-mm rounds (also available on the non-upgraded IAR-99 Standard). Alternatively, a laser designator pod (LDP), ECM pod, a photo pod or a 225-litre (49.5-imp gal) drop tank can be carried. The wing hardpoints can carry 250-kg (551-lb) and 50 kg (110-lb) bombs.

Air-to-air missiles for self defence can be installed on the wing outer pylons and include the Rafael Python 3, Vympel R-60 or older R-3S or R-13 air-to-air missiles. The inboard pylons can carry free-fall bombs, bombs on multiple bomb racks, laser- or infrared-guided bombs or 57-mm

rockets. The weapon systems are controlled by the stores management system.

### IAR-330 SOCAT

On 30 July 1974 the contract for license production of the SA330L Puma helicopter by IAR Brasov under the local designation IAR-330L Puma was signed. On 22 October 1975, the first flight of the IAR-330L Puma helicopter took place. The IAR-330 Puma was license built in Romania from 1977 onwards with 104 produced.

However, in need of a multi-function helicopter able to accomplish difficult missions, including ground attack, in support of land forces in the environment of the modern battlefield, the Romanian air force launched the Puma 2000 programme in 1992 and, with the help of Israel's Elbit Company, the SOCAT (Optical-Electronic Reconnaissance and Anti-Armour System) helicopter was developed.

In September 1995, the Romanian air force signed a contract for the conversion of 24 IAR-330L Pumas to SOCAT configuration. The SOCAT upgrade programme resulted in a helicopter well ahead of its time, being designed to accomplish ground attack missions in support of

land forces, perform battlefield reconnaissance with a real-time datalink, as well as performing search and rescue, battlefield extraction and transportation missions from rough terrain, day and night, with an all-weather capability.

It is capable of detecting, identifying and defeating enemy combat forces and assets at long range and with high precision. The SOCAT has been developed to execute precise, long-range and low-level nap-of-the-earth navigation, by day and night and in all weathers, while being able to share real-time reconnaissance data with ground terminals and other aircraft. Furthermore, it is equipped with HOCAS controls (hands on collective and stick), automatic briefing and debriefing systems for shortening the recovery and mission preparation time.

Nevertheless, the SOCATs were not newly built helicopters, but airframes that were converted from existing IAR-330L models. The first IAR-330 prototype (PT1) upgraded with the SOCAT system made its maiden flight in its new configuration on 26 May 1998. The second prototype (PT2) made its first flight from the airport of IAR S.A. at Ghimbav, near Brasov, on 23 October 1999. Equipped with the GIAT (now Nexter) THL-20 20-mm nose-mounted cannon with 850 rounds, together with four LPR 57 (UB-16-57) unguided rocket launchers or eight Rafael Spike-ER anti-tank guided missiles (on the outer two hardpoints), the SOCAT can throw more than a serious punch.

In early 2001 the first SOCAT was delivered to the 612th Attack Helicopter Squadron at Titu-Boteni, but when this base was closed at the end of 2004, all SOCAT helicopters were moved to Otopeni. The SOCAT upgrade programme ended on 9 June 2005 when the 25th and final helicopter to be upgraded was officially handed over to the Romanian air force as an attrition replacement for a SOCAT that was the first to be lost in a crash on 16 August 2001 shortly after



*Above: The IAR-99 fulfils basic and advanced training needs for the Fortele Aeriene Romane. The two aircraft in the foreground are IAR-99C Soims, readily distinguished from the Standard by the radar warning receiver antennas on the tail and forward fuselage.*

*Right: The IAR-99 Standard lacks many of the Soim's systems, but can be used for weapons training.*

take-off from Boteni-Titu Air Base. The last SOCAT delivered was actually the original prototype SOCAT Puma that had made its first flight on 26 May 1998. As such it had been retained as a development aircraft until being brought up to full operational standard before delivery.

### Althea SOCATs

Following its increased engagement in the warzone of former Yugoslavia, the European Union launched the Althea mission in Bosnia-Herzegovina on 2 December 2004. Developed under the aegis of the European Union, it succeeded the NATO SFOR mission. On 4 January 2005 a detachment of Baza 90 consisting of 40 servicemen and four IAR-330L SOCAT helicopters left Otopeni for Bosnia and Herzegovina. The following months, they were part of the EUFOR (European Union Force), operating under the operation name of Althea.

The four IAR-330 SOCAT helicopters were deployed not only to perform personnel and cargo airlift missions, but also to provide air reconnaissance, search and rescue, and evacuation capabilities in the theatre of operation. On 4 July 2005, Alpha detachment completed its mission in the war theatre in Bosnia and Herzegovina to be replaced by Bravo detachment, continuing the participation of the Romanian Air Force in Operation Althea.

Personnel of the Alpha detachment arrived back in Romania after their six-month mission on 11 July 2005, having performed over 250 missions, totalling over 600 flying hours. The four IAR-330L Puma/SOCATs were based at the



EUFOR camp at Banja Luka in the heart of the Republika Srpska. Currently, the remaining 23 IAR-330 SOCAT attack helicopters are assigned to the 904th and 905th Attack Helicopter Squadron at Otopeni and staffed with a total of 36 pilots.

### LanceR replacement

As the LanceR fleet is becoming increasingly more expensive to operate and with a desire to comply even more closely with NATO standards, in 2007 the Romanian air force expressed its intention to replace its upgraded Aerostar MiG-21 LanceRs from 2010-11 onwards with a new fleet of at least 40 single-seat fighters and four two-seat trainers, with candidates including the Eurofighter Typhoon, Lockheed Martin F-16 and Saab Gripen. The deal is expected to be worth Euro4.5 billion, including training and initial logistics support.

However, by mid-2009 no official announcement had been made on whether a tender would be released concerning this acquisition. Discussions in Romania continue over whether this purchase will be conducted through a tender or through a 'competitive dialogue', as

Romanian law allows for both options.

As usual, the competition is fierce and the Eurofighter consortium in the meantime has indicated that it can satisfy the programme requirement within the allocated budget, and deliver a requested 80 per cent offset package for local industry, including a local assembly line and the ability to perform maintenance support and upgrades. Offering 24 Typhoon aircraft, the first operational squadron could be provided for 2010 and the rest delivered in the 2010-2014 period.

The consortium has already assessed the technical capabilities of Avioane Craiova and is known to be evaluating Aerostar at Bacau. Eurofighter also indicated that it could rapidly present a new proposal to supply Romania with refurbished and upgraded second-hand Typhoons if its defence ministry is forced to change its programme requirements, which could also include a leasing option.

Ahead of a possible tender or competitive dialogue, the Defense Security Cooperation Agency (DSCA) notified US Congress in May 2008 of a possible Foreign Military Sale (FMS) to Romania of 48 F-16C/D Block 50/52 aircraft,



**The IAR-330L Puma serves at all FAR bases. This formation represents the medevac (foreground), standard assault transport (centre) and SOCAT variants.**

potentially consisting of 24 F-16C/D Block 50/52 aircraft 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 F-16C/D block 25 aircraft being provided as Excess Defense Articles with the F100-PW-220 and APG-68(V)1 radars. Also included in the DSCA notification were associated equipment such as 12 AN/AAQ-33 Sniper or AN/AAQ-28 Litening Targeting Pods, four Tactical Air Reconnaissance Systems or DB-110 Reconnaissance Pods, four AN/APX-113 Advanced Identification Friend or Foe (AIFF) systems, 28 AN/ALQ-213 Electronic Warfare Management systems, and 28 AN/ALQ-211

**Industria Aeronautica Romana built 250 Aérospatiale Alouette III's under licence as the IAR-316. One was converted to a prototype gunship configuration as the IAR-317 Airfox.**

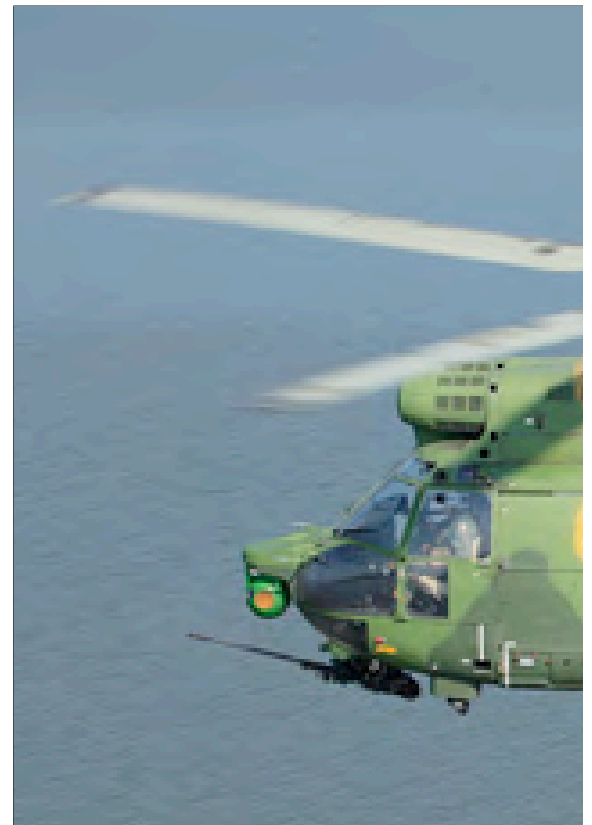
Advanced Integrated Defensive Electronic Warfare Suite (AIDEWS) or AN/ALQ-187 Advanced Countermeasures Electronic Systems (ACES), or AN/ALQ-178 Self-Protection Electronic Warfare Suites (SPEWS).

Saab is also actively marketing the Gripen to Romania, offering the JAS 39 Gripen Next Generation (NG) as well as refurbished second-hand aircraft. Similar to other companies, Saab is investigating which Romanian partners could become involved in the Gripen offset programme.

However, amidst a global economic crisis, a decision in the short run is not expected and it must be stated that several more NATO countries are facing similar problems with fighter aircraft nearing the end of life, or becoming increasingly expensive to operate. Nevertheless, with several impressive upgrade programmes and reorganisation efforts already realised, the Romanian air force is very well prepared for any new multi-role aircraft to be procured, whatever its provenance may be.

**Opposite, top: A Puma SOCAT leads an air ambulance version during a training exercise. IAR has built over 160 Pumas, of which 104 were delivered to the FAR with the remainder for export. As well as the air force versions, IAR has developed a naval variant – based on the SOCAT avionics architecture – of which three have been built for the Romanian navy.**

**Below: The SOCAT represented a cost-effective means of providing a battlefield helicopter for the FAR. The Nexter 20-mm cannon provides good suppressive fire, while Spike missiles give the SOCAT a precision punch.**





## Fortele Aeriene Romane – current force

Romania has five active airbases at Campia Turzii, Borcea-Fetesti, Bucuresti-Otopeni, Bacau and Boboc. The air force also maintains two reserve bases from where helicopter squadrons operate.

### Baza 71 Aeriana (71st Air Base) – Campia Turzii



Campia Turzii airfield was built by the Romanian Air Force in the years 1952-1953. From the new base it initially operated Ilyushin Il-10 ground attack aircraft. In 1969, an anti-aircraft artillery unit was added to the airbase with its mission to protect the base against air attacks. On 30 June 1982 the 48th Fighter Squadron was established on the Caracal-Deveselu airfield operating the Mikoyan-Gurevich MiG-21M fighter aircraft. The squadron then reported to the 91st Fighter Regiment and would later become the core of the 71st Air Base.

On 30 June 1986 the 48th Fighter Squadron was reassigned to the 71st Fighter Regiment, continuing its tasks from Caracal-Deveselu airfield. On 9 June 1987 the 71st Regiment started its operations at Campia Turzii airfield with the first MiG-21 taking off from its new home base for a training mission on 9 July 1987.

In January 2001, the unit received its first MiG-21 LanceR fighters fresh from the AeroStar factory, allowing the pilots to start their conversion to the new type. The current structure of the 71st Air Base, being an integrated air base, was created on 1 June 2002 as a result of the Romanian Armed Forces' reorganisation programme. As a result of this restructuring, the airbase also absorbed all the aircraft and personnel

of the former 93 Fighter Air Base at Timisoara-Giamata, as well as the helicopters and personnel of the former 58 Helicopter Base from Sibiu.

The last three MiG-23 'Floggers' previously assigned to Baza 93 Aeriana had been retired in early 2002 and the 93rd Air Base at Timisoara-Giamata was eventually disbanded in August 2004 with the unit's MiG-21 LanceRs moving to Campia Turzii, to be reassigned to Baza 71 Aeriana. Baza 91 Aeriana continued to operate older, unmodified versions of the MiG-21 until the beginning of 2002, when the unit was disbanded and Caracal-Deveselu closed.

Nowadays, the 71st Air Base consists of four units, comprising two fighter squadrons and two helicopter squadrons. The first fighter squadron is the 711th Fighter Squadron, operating a mix of MiG-21 LanceR A and B models alongside the 712th Fighter Squadron, which utilises a mix of MiG-21 LanceR B and Cs.

The latter provided four MiG-21 LanceR Cs for the 'Baltica 07' mission. Since 1 April 2004, when the three Baltic states of Estonia, Latvia and Lithuania became members of NATO, air policing tasks are performed by NATO member states. Romania participated in the Baltic Air Policing by sending four MiG-21 LanceR Cs, which were deployed from August 2007 to

**A LanceR A shows its belly to the camera, revealing the GSh-23 23-mm cannon. One of Campia Turzii's squadrons flies this variant, along with LanceR B two-seaters.**

November 2007 at Siauliai airbase in Lithuania.

Besides the four aircraft, most of the staff also came from the 71st Air Base and a total of 67 personnel, among them nine pilots, were part of the detachment. Sixty-three served at Siauliai airbase, while the remaining four served at the air traffic control centre near Kaunas, to ensure smooth cooperation with local authorities. The Romanian detachment attracted significant attention from the local media, not least because it was only the second time a fighter from the Soviet era had deployed to Siauliai (Polish Air Force MiG-29s were deployed there in 2006).

The Romanian 'Baltica 07' detachment completed its mission on 31 October 2007. On that occasion, during a formal ceremony organised at Siauliai Air Base, the Romanian Detachment Commander, Lieutenant Colonel Laurentiu Chirita, handed over to his Portuguese counterpart the key to the Baltic Airspace – symbol of the Baltica mission. The Romanian Air Force will perform this mission again, in around three to four years' time.

Besides the two fighter squadrons, Campia Turzii also houses the 713th Helicopter Squadron operating the IAR-330L Puma. The other helicopter unit reporting to the 71st Air Base is the 714th Helicopter Squadron. The latter unit, however, operates a contingent of IAR-330L Pumas out of Timisoara airport. At the end of 2008, Campia Turzii received its first of a total of eight so-called NATO Pumas, a similarly upgraded version as the IAR-330 SOCAT, albeit without the weapon aiming and delivery systems.

**Campia Turzii is home to two LanceR squadrons, one with the attack version (illustrated) and one for air defence duties. Note the RWR antennas on the sides of the forward fuselage.**



Baza 86 Aeriana (86th Air Base) – Borcea-Fetesti



On 10 March 1952 the 206th Tactical Fighter Regiment was created, becoming part of the 66th Tactical Aviation Division. It began operations on 19 March 1952 from Deveselu airbase and its structure included the command of the regiment, staff and three aviation squadrons. At the very beginning, the inventory of the 206th Tactical Fighter Regiment included only Yak-11 and Yak-18 trainer aircraft. From May 1952 onwards, Mikoyan-Gurevich MiG-15 fighters began to enter service with the 206th Tactical Fighter Regiment, being the first to receive the new aircraft, and becoming operational on the 'Fagot' in less than two months.

On 15 July 1953, the 206th Tactical Fighter Regiment was deployed to Ianca airbase, from where it operated until 1 May 1955, when it entered the structure of the 23rd Tactical Aviation Division to be re-deployed to Otopeni airbase near Bucharest. After the deployment at Bucuresti-Otopeni airbase, the pilots of the regiment began their conversion to fly the first of 10 brand new MiG-17PF 'Frescos', the first jet fighter in Romania equipped with interception radar. The 206th Tactical Fighter Regiment, along

with the 499th Airfield Technical Base, deployed once more on 9 August 1958 when the unit was moved to Borcea-Fetesti airbase. From 1967 it would operate the most advanced fighter of that time, the MiG-21F-13.

Two squadrons operated the MiG-21F-13 from Borcea-Fetesti alongside one squadron equipped with the MiG-19 'Farmer'. In 1974, the newer MiG-21PFM 'Fishbed-F' replaced the latter, while the MiG-21F-13s were replaced by a more modern version of the MiG-21, the MiG-21MF 'Fishbed-J'.

From 1997 onwards, one squadron underwent intensive training to make it able to carry out joint missions with NATO Partnership for Peace forces, for which a special training programme had been created. Aimed at reaching a higher level of interoperability, the fighter-bomber squadron became fully equipped with the MiG-21 LanceR.

At the end of 2000, during the reform of the Romanian Air Force, the structure of the 86th Air Base was changed again, incorporating the former 38th Reconnaissance Squadron. For a short while, the base was home to MiG-21

*Borcea-Fetesti has been home to the MiG-21 for more than four decades, and has operated four generations of the 'Fishbed', culminating in the LanceR. This is a LanceR A of the 862nd Fighter Squadron.*

LanceR, Harbin H-5, Antonov An-30, radar and air defence units. In 2001, the structure of the airbase was altered again with the reconnaissance squadron being disbanded on the last flight of the H-5, which took place on 26 August 2001. Finally, the former 57th Airbase Helicopter Squadron was integrated into the airbase structure in 2003.

The current structure of the airbase includes two fighter squadrons with the MiG-21 LanceR, with the 861st Fighter Squadron operating the MiG-21 LanceR B and C models for air defence and air policing missions, while the 862nd Fighter Squadron flies the MiG-21 LanceR A and B models and is dedicated to ground attack missions.

*The 861st Fighter Squadron flies the LanceR C from Borcea-Fetesti. The base provides air defence for the eastern portion of Romania, including the Black Sea coast, while Campia Turzii covers the west.*





A third unit reporting to the Baza 86 Aeriana is the 863rd Helicopter Squadron, operating a handful of IAR-330L Pumas from Mihail Kogalniceanu Airport, this being the former 57th Air Base.

Over the last ten years, pilots of the 86th Air Base have participated in many multinational exercises such as NATO's Cooperative Key Partnership for Peace series, deploying aircraft to Romania, Slovakia, Turkey, Bulgaria and France. The 86th Air Base has also hosted many bi-lateral exchanges at home. With the French Air

Force it trained during the Volfac exercises held in the 1998-2001 period and the Chasseur Accompli exercise series held at Borcea between 2003 and 2006.

Other bi-lateral exercises were held with the Royal Air Force: in 2003 Lone Kite (Harriers), 2004 Lone Cheetah (Jaguars) and 2005 Lone Fiol (Tornados) were all held at the base and, in 2007, the airbase hosted Sniper Lance with United States Air Force Europe sending F-15Es from RAF Lakenheath. Since 2001 the average number of flight hours per pilot per year has

**The FAR's 14 LanceR B two-seaters are distributed between the three bases that operate the type. They are used for conversion and continuation training by both LanceR A and LanceR C units.**

increased noticeably, from 80 to 120 hours in 2007.

Today, the 86th Air Base has a modular structure, reflecting NATO's airbase model, providing all that is necessary to plan, organise, command and execute the missions it may be tasked with, providing air defence for Romania as well as supporting NATO operations.

## Baza 90 Aeriana (90th Air Base) – Bucuresti-Otopeni

In 1949 the 49th Airlift Division was established at Bucuresti-Otopeni airbase to operate aircraft such as the Li-2 'Cab', Il-14 'Crate' and the Il-18 'Coot'. In 1971, a special squadron was created, which in 1972 was transformed into the 50th Airlift Wing and 99th Airlift Division using Il-18 'Coot', Il-62 'Classic', Boeing 707, BAC-1-11, An-2 'Colt', An-24 'Coke', An-26 'Curl' and An-30 'Clank' aircraft, as well as IAR-316 Alouette III, IAR-330 Puma, Mi-8 'Hip', Mi-17 'Hip' and SA 365 Dauphin helicopters.

Resulting from further organisational changes, the 90th Airlift Base and the 76th Airport Technical Group were formed in 1990, using the An-24, An-26, An-30, IAR-330, Mi-8, Mi-17 and SA 365. In 1995, the structure of this unit was once more changed to become the 90th Airlift Base, resulting from the unification of the two units. In 1996 its name was changed to the 90th Airlift Base 'Comandor Aviator Gheorghe Banciulescu'. This was in honour of a famous Romanian pilot who had two wooden legs and flew the SET 4 record version (41R) on a 9000-km (5,600-mile) tour of 15 European countries over nine days.

**Otopeni is home to the 903rd Transport Helicopter Squadron, which operates the ubiquitous IAR-330L Puma. It is shortly to acquire the IAR-330M NATO Puma.**

As a result of the base closure of Titu-Boteni, the 61st Attack Helicopter Regiment was transferred to the 90th Airlift Base in October 2004, adding 24 IAR-330 SOCAT attack helicopters to its inventory. That same year, Romania showed international commitment by performing 216

missions (totalling 1,428 flight hours) with its C-130B Hercules in missions into Iraq and Afghanistan (Enduring Freedom).

Today, the 90th Airlift Base consists of five squadrons: two air transport squadrons and three helicopter squadrons. The 901st Strategic





**Above: The FAR's single An-30 is on the strength of the 902nd Transport and Reconnaissance Squadron. It carries two 90th Air Base badges on its forward fuselage, and 'Open Skies' logo on the fin.**



**With the An-24s retired in 2007, only four An-26s are left in service, shortly to be replaced by C-27Js.**

Transport Squadron currently has three Lockheed C-130B and one C-130H Hercules aircraft in its inventory. Romania was the first former member of the Treaty of Friendship, Cooperation and Mutual Assistance (Warsaw Pact) to operate the Hercules, and four ex-USAF C-130B models were delivered with the first two airplanes landing at Otopeni on 23 October 1996, followed by the remaining two on 16 February 1997. The Hercules significantly enhanced Romania's airlift capability and tactical range, while making a significant step towards NATO interoperability.

These recently acquired assets became instrumental when Romania's Parliament declared in 2001 that participation in peacekeeping, humanitarian and counter-terrorism operations was a major goal of Romanian security and defence policy. However, Romania's active participation in multilateral operations began long before 2001. Following the end of the Cold War, its first overseas deployment was in 1991 when a field hospital was deployed in support to Operation Desert Storm.

In support of Operation Enduring Freedom (OEF), Romania intensively used its own C-130

aircraft from 2002 onwards in support of an infantry battalion of 400 troops and a nuclear, biological and chemical warfare company (70 troops) stationed at Kandahar. A regular air bridge was maintained between Romania and Afghanistan. This was the first deployment mission that the Air Force had carried out abroad since World War II.

In early 2005, the Romanian Air Force even contracted out the air cargo capacity of its Hercules fleet to the Hungarian Ministry of Defence for flights between Budapest and Afghanistan.

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

In advance of the receipt of this aircraft, members of the 373rd Training Squadron, Detachment 4, from Little Rock, Arkansas, provided training for 16 Romanian air force

maintainers with a custom-made programme at the C-130 Center of Excellence. The purchase was part of a US Defense Department-sponsored agreement that also included an upgrade programme for the four B-models, enabling Romania to bolster the alliance's strategic airlift capability as part of its contribution of forces to NATO. The upgrade and sustainment programme aimed at all four C-130Bs includes avionics upgrades, spare parts, publications, technical support, repair and return, contractor logistic support, ground support equipment, T56 engines and propellers, defence services and training.

It will also involve installing new equipment such as UHF and VHF communications, a crew intercom, a cockpit voice recorder, an emergency locator beacon and a Combined Radio Altitude Altimeter. All subsequent avionics upgrades will be carried out in Romania using kits from Lockheed Martin. When the work is completed, all Romania's Hercules will be to a common C-130H configuration.





**Romania's Hercules fleet has been heavily used, especially on missions to support NATO peacekeeping efforts. A single C-130H partners upgraded C-130Bs.**

The last remaining four An-26 'Curls' and single An-30 'Clank' are assigned to the 902nd Transport and Reconnaissance Squadron. The Antonov An-24 'Coke' is no longer in use: on 26 July 2007 a 20-minute commemorative flight was flown over Otopeni airbase to mark the last mission of the An-24 in air force service.

In the early 1970s the Romanian air force received approximately 14 An-26s, of which now only four remain in service. All of them wear a grey colour scheme, although in the mid-1990s the An-26 wore white colour schemes with TAROM or Romavia titles and civilian registrations. Some of them can still be seen stored at Otopeni.

For its missions the An-26 has a crew of five, consisting of two pilots, navigator, radio operator and flight engineer. The squadron currently consists of 22 pilots who each accumulate some 100 flight hours on average per year.

A unique aircraft in Romanian service is the Antonov An-30 'Clank', of which three were originally received in December 1976 for photo-reconnaissance and aerial mapping tasks. Besides its regular aircrew, the An-30 has an additional operator for its photo equipment. Nowadays only one An-30 remains operational, which wears the same grey colour scheme as the remaining An-26s and is mainly tasked to execute missions under the Treaty on Open Skies (OS), to which Romania is a signatory state. For this mission, the An-30 is equipped with a total of five cameras, consisting of two Wild RC-30 aerial mapping cameras with forward motion compensation (FMC), one Zeiss LMK-1000 large-format 152-mm film camera with FMC, and two French-built Omera-33 cameras capable of 10-cm ground resolution under optimal conditions. They are coupled to the GPS-based LH Systems Ascot flight management system.

All aircraft used for Open Skies are subjected to rigorous certification standard and inspection to ensure that their sensors are approved and

conform to the standards of the treaty. Although the Treaty on Open Skies was originally negotiated between members of NATO and the former Warsaw Pact as a means of building confidence in the arms control process, the Warsaw Pact ceased to exist before the treaty was signed in Helsinki, but the former members of that alliance nevertheless continued to support Open Skies. A bilateral Open Skies Agreement between Hungary and Romania is also in place, for which the An-30 is utilised.

The air force will further bolster its airlift capacity when it starts receiving the Alenia C-27J Spartan. The C-27J was selected in November 2006 to replace the Romanian air force's Antonov An-24/26s as their service lives are rapidly expiring and the platforms are becoming increasingly expensive to operate. At the same time, new aircraft should be compatible with NATO operating requirements, something the Antonov fleet is not.

A tender was organised by Romtehnica, with Alenia being selected to meet the seven-aircraft requirement. However, the tendering procedures were disputed by the other participant in the tender, EADS Construcciones Aeronauticas SA of Spain, which had offered the C-295 to meet the requirement. Alenia's initial win was consequently scrapped by the National Authority responsible for supervising public procurement deals.

Both the government and Alenia took the decision to the Court Section for Administrative and Civil Law which ruled in June 2007 that Alenia had the right to deliver the aircraft. In December 2007, Romtehnica (a company reporting to the Ministry of Defence) and the Italian company Alenia Aeronautica finally signed a contract for the acquisition of seven C-27J Spartan medium transport aircraft, and the initial delivery was scheduled to take place at the end of 2008, with the remaining aircraft spread over the following five years to augment the Hercules fleet.

**Wearing the 90th Airlift Base 'Comandor Aviator Gheorghe Banciulescu' badge on its nose, a C-130 rests on the ramp at Otopeni. The base is also a stop-over for other NATO transports on their way to Afghanistan.**





**Bucuresti-Otopeni is the home base for the SOCAT Pumas of the 61st Attack Helicopter Regiment. The regiment has two constituent units, the 904th and 905th Attack Helicopter Squadrons.**

For transport, and search and rescue duties, the 903rd Transport Helicopter Squadron operates the IAR-330L Puma and, in the near future, the IAR-330M NATO Puma. In order to perform the SAR duty, two helicopters are generally kept on a 45-minute alert. On average, a 203 Squadron pilot flies about 80 hours per year, but at the beginning of 2008 the squadron only had two helicopters available (one for SAR and one for transport) with the remaining three at IAR Brasov for maintenance and repairs. To perform

its tasks the squadron has 15 pilots, co-pilots and flight engineers available. The squadron played an important role during the floods in 2005 and 2006 in Romania, when four Pumas (one SAR and three transports) were deployed for SAR, hoist, supply and evacuation missions.

Currently the Romanian Air Force is in the process of modernising 12 standard IAR-330L Pumas into upgraded IAR-330M Pumas, also called NATO Puma. They are similar to the existing SOCATs that are equipped with weather radar, INS/GPS, digitised moving map, multi-function displays (MFD), navigation system, HOCAS (hands-on-collective-and-stick) and night vision system. However, the SOCAT's nose-mounted stabilised turret with FLIR, video-CCD, laser

range-finder and auto-tracking, two anti-tank missile pylons and 20-mm turreted gun (850 rounds) will not be installed in the upgraded NATO Pumas.

For the introduction of the NATO Puma into Romanian service a virtual squadron has been created, consisting of the most experienced Puma pilots from Campia Turzii and Otopeni, including some SOCAT pilots. By the end of 2007 nine out of 12 IAR-330s had already been converted and delivered to the Romanian Air Force with the remaining being delivered in 2008. Eight of the 12 NATO Pumas were assigned to the 71st Air Base at Campia Turzii, the remainder four helicopters being based at Otopeni.

### Baza 95 Aeriană (95th Air Base) – Bacau

With the purpose of improving engineer and pilot training, the Training Centre of Aviation emerged from the 4th Aviation Group that had operated from Tecuci airfield since 17 June 1920. As a result of a reorganisation process, the Aeronautics Training Centre was setup in 1924, but after World War II the Aeronautics Training Centre was reorganised once more to operate from Medias, Tecuci and Buzau. The centre was disbanded in 1953 and its activities were transferred to other training establishments with the Training Centre of Aviation being re-established at Bacau airfield in 1968. Since then, the Training Centre of Aviation has trained over 500 fighter pilots on the MiG-21 and provided aviation training to over 6,000 other military personnel in different trades.

On 25 August 1995 the 95th Air Base was created with the purpose of supporting the 95th Fighter Group, which continued to train MiG-21 pilots. It also supported the MiG-21 LanceR test activities at the AeroStar company, co-located at the airfield and responsible for carrying out maintenance, modifications and repairs on most



**During 2005-07 Bacau was used for jet training due to problems with the runway at Boboc. Here an IAR-99C Soim lands at the base during that period.**



**Bacau is one of three FAR bases accommodating LanceRs. The 951st Fighter Squadron flies LanceR A fighter-bombers.**

of the aircraft in the Romanian air force inventory. On 25 March 1997 the first LanceR was delivered to this unit, which was declared fully operational on 8 May. Resulting from yet another reorganisation process, from 1 May 2001 until 1 July 2004, Bacau became home to the Centre for Transition to Supersonic aircraft for young pilots for the MiG-21 LanceR programme.

From 1 July 2004, the Centrul 95 Treccere pe Avioane Supersonice (95th Centre for Transition to Supersonic aircraft) was re-designated Baza 95 Aeriana (95th Air Base). The training task was transferred to the 205th Fighter Squadron, a

dedicated training squadron operating some MiG-21 LanceR Bs from Bacau, but subordinated to the Scoala de Aplicatie pentru Fortele Aeriene 'Aurel Vlaicu' (Application School for the Air Force) at Boboc.

The current structure of Baza 95 Aeriana incorporates the 951st Fighter Squadron operating both the MiG-21 LanceR A and B for ground attack and close air support (CAS) missions, and the 952nd Helicopter Squadron employing IAR-330L Pumas for medevac, SAR, airlift and reconnaissance missions. The latter also provides operational training for the medevac mission to the other IAR-330 Puma units in the Romanian Air Force.

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, however, have since been retired from operational service and only the training school at Boboc operates a handful.

During the 2005 flooding, IAR-330 Pumas from Bacau rescued over 500 people and delivered over 200 tons of medical supplies to the devastated area of Comanesti. Like their colleagues of the 86th Air Base at Borcea-Festeti, the pilots of the 95th Air Base have participated in many bilateral and multinational exercises, such as the Co-operative Key and VOLCAC series.

## Reserve air bases – Mihail Kogalniceanu and Timisoara-Giarmata

Romania maintains two reserve bases from which it operates single squadrons equipped with IAR-330 Pumas. The first reserve base is Mihail Kogalniceanu Airport near Constanta. This is the former Baza 57 Aeriana, from where in its active days two squadrons of MiG-29 'Fulcrums' were operated.

The first two MiG-29A single-seaters (model 9-12) and two MiG-29UB (model 9-51) two-seaters were delivered to Romania shortly before the 1989 revolution, but the first training flights did not start before March 1990. Initially 14 MiG-29As and four MiG-29UBs were delivered, but later an additional two MiG-29As were received to replace attrition losses, and in 1992 a single MiG-29C (model 9-13) was received from the Moldovan Air Force.

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 Aeriana was disbanded altogether, with the LanceRs returning to Borcea-Festeti. The base is now an annex from Baza 86 Aeriana, with the helicopter squadron of Baza 57 Aeriana being reassigned to Baza 86 Aeriana.

In 2000 the Aerostar company together with Elbit launched the Sniper programme and offered an upgrade package for the MiG-29. Although plans existed to upgrade at least 12 of these 'Fulcrums', the government announced in January 2003 the retirement of the 'Fulcrums' and the aircraft remain in storage at the base.

The other reserve base is Timisoara-Giarmata,

home to the 714th Helicopter Squadron operating a contingent of IAR-330L Pumas. Assigned to Baza 71 Aeriana at Campia Turzii, the Pumas now reside at the former Baza 93 Aeriana, the last base in Romania from where MiG-23 operations took place. Only four 'Floggers' were operational by 2000 and the final MiG-23 sortie was flown in September 2001, after which the squadron was disbanded. With the withdrawal of the 'Flogger' from operational service and the fact that the air force reorganisation process did not yield a new mission for the base, the 93 Air Base was finally disbanded in August 2004.

**The FAR has a number of retired aircraft in storage. This Harbin H-5 remains in open storage at Borcea-Festeti, several years after its last flight in 2001.**



## Fortele Aeriene Romane – education and training system

The Romanian air force has three training facilities, comprising the Air Force Academy, the Air Force Non-Commissioned and Technical Officer School, and the Air Force Application School. The Air Force Academy 'Henri Coanda' was established by Governmental Decision no. 616 on 11 August 1995 and was given the name of Romania's famous scholar and inventor Henri Coanda. The Academy continues the activities and traditions of the 'Aurel Vlaicu' Military Aviation School, 'Avram Iancu' Radar School and 'General Bungescu' Anti-Aircraft Artillery School.

Romania's first Military Aviation School was founded on 1 April 1912 at Cotroceni, being one of the first five institutes of this kind in the world. The first Officer School for Anti-aircraft Artillery was set up soon after the beginning of World War II on 10 December 1939, while the first Radar Officer School in Romania was set up on 1 December 1952, at Sibiu.

The Air Force Academy's mission is to train students to become officers for the following specialities: pilot, navigator, meteorologist, air defence artillery and missiles, and radar operation.

The Air Force Non-Commissioned and Technical Officer School 'Traian Vuia' finds its origins in the Aeronautics Military Specialists School that was established in 1920 on Pipera airfield in Bucharest. A year later, the school moved to Medias and the school received the name 'Traian Vuia' in 1954, named after the Romanian inventor who designed, built and flew the first self-propelling heavier-than-air aircraft in Europe in 1906.

In 1939 the Anti-Aircraft Artillery Officer School was established and included a section for non-commissioned officers. In 1960 the Military School for Anti Aircraft Artillery and Radar Non-commissioned and Technical Officers was established in Brasov. Both schools were merged together on 1 September 2001 into a new entity, the Air Force Non-commissioned and Technical Non-commissioned Officer School 'Traian Vuia'.

As a result of military educational system restructuring, the school was co-located in Boboc (near Buzau) on 15 September 2004 with the Air Force Application School 'Aurel Vlaicu'. Nowadays the school educates and trains non-commissioned officers to become specialists in operating, maintaining and repairing the air force's equipment and weapon systems. Its specialities include training on air craft and aircraft engines, onboard weapon systems,



ammunition, missiles, survival equipment, electro-mechanics, avionics, operation of various radar types, anti-aircraft artillery and ground-to-air missiles. As far as the curriculum is concerned, the school is subordinated to County Educational Inspectorate.

### Air Force Application School 'Aurel Vlaicu'

In 1911 there were two pilot training schools in Bucharest where the first military pilots received their wings: second lieutenant Stefan Protopopescu, second lieutenant Gh. Negrescu, second lieutenant Mircea Zorileanu and second lieutenant Nicolae Capsa. Teaching methods were very modern considering that the first Romanian pilots learned to fly an aircraft using dedicated trainers built in the Chitila workshops. Those aircraft were single-seated and the trainees went solo on their first flight.

On 1 April 1912 the first Military Pilot School was established under the command of Major Ion Macri. The second Romanian school, named 'Flying School for Military and Civilian Pilots' was established by Valentin Bibescu on 1 August 1912 at what is now Baneasa Airport. Both schools trained and licensed about 100 military pilots in a relatively short period of time (1912-1918). During World War I, the Military Aviation School was evacuated for a time to Tecuci, then Birlad, Botosani and Odessa.

Between the two world wars, a training

*No longer used for any operational role, the venerable An-2 'Colt' provides a useful tool with which to introduce students to the demands of transport flying.*

school for flying officers operated at Cotroceni in Bucharest, while the Flight Training Military School in Tecuci and War Pilots Improvement School in Buzau were established. The latter was created to improve flying skills of the graduated pilots coming from Cotroceni and Tecuci. Initially the syllabus covered a two-year period but, after 1930, a three-year course was provided as increasing combat requirements demanded improved skills and a higher training level. The learning process covered training modules structured according to the proficiency requirement: basic training with Morane MS.109 and advanced training with fighters (Fokker D.111, Spad 61) or reconnaissance aircraft (Potez 15). A school for bombers was established at Constanta.

In 1940 the Military Aviation Schools in Tecuci and Buzau moved to Zilistea-Boboc airfield and, when Romania entered the war for national unification on 22 June 1941, the pilots deployed at this airfield were the first to accomplish a mission - bombing the northern and southern area of Kishinev.

*The Aero L-29 and L-39 (illustrated) were important elements of the FAR's fast-jet syllabus, but both types have now been retired in favour of the indigenous IAR-99 and IAR-99C.*





*Prospective Romanian air force pilots first get a taste of flying in the Aerostar IAK-52, operated from Boboc by the 201st School Squadron. The type has been in service since 1986.*

After World War II, according to the conditions imposed by the Allied Control Committee, Military Aviation Schools were disbanded. Starting in 1948, new military aviation schools were established in Sibiu, Medias and Tecuci. In 1953, the authorities changed the name of the Military Aviation School no.1 in Tecuci to Air Force Officer School 'Aurel Vlaicu' and in 1958 it returned to Boboc. There it became an officer higher educational school with four-year courses, training both civil and military pilots, as well as flying and non-flying personnel.

The anti-Communist revolution in December 1989 raised new perspectives for the establishment. In 1991, the school transformed into the Air Military Institute 'Aurel Vlaicu', and since

1997 it has transformed into the Air Force Application School 'Aurel Vlaicu'. The Academia Fortelor Aeriene (air force academy) 'Henri Coanda' in Brasov has taken over the tasks concerning the academic training of future Air Force officers.

On 1 August 2004, as a result of the air force's transformation and re-sizing, the establishment changed its name into Scoala de Aplicatie pentru Fortele Aeriene, or Air Force Application School (AFAS) and included the three branches specific to the air forces: air force, artillery and ground-to-air missile, and radar.

Because of problems with the runway at Boboc the AFAS jet training has been conducted elsewhere in recent years. During 2003 and 2004 Ianca airbase was used, but under the 2004 air force re-structuring the base was closed and the IAR-99s had to move to Bacau. In 2005 the L-29 Delfin was finally retired and only a small number of L-39 Albatross were used alongside



the IAR-99 for training. In September 2007 runway and infrastructure repairs at Boboc were completed and, after spending three years at Bacau, the Soims, Standards and Albatrosses finally returned to their home base to rejoin the other AFAS training squadrons. On 13 December 2007 a Soim simulator was inaugurated at Boboc, produced by the Romanian company Simultec that is owned by Elbit.

Today the 'Aurel Vlaicu' Flight School consists of five units: the 201st School Squadron operating Yakovlev IAK-52; the 202nd School Squadron flying the Antonov An-2 'Colt'; the 203rd School Squadron using the IAR-99 Standard and until 2007 the L-39ZA Albatros; the 204th School Squadron operating the advanced IAR-99 Soim; and finally the 206th School Squadron operating the last of five IAR-316B Alouette IIIs in Romanian air force service. Young people (men

*As well as being used for basic flying instruction, the IAK-52 introduces FAR pilot recruits to basic military skills such as formation-flying and aerobatics.*





**The 206th School Squadron provides rotary-wing instruction on five IAR-316B Alouette IIIs, the last survivors of a once large fleet operated by the Romanian air force.**

and women) having a high-school diploma can apply for the entry examination at the Military Academy, after Regional Recruitment Centres and the National Institute for Aeronautical and Space Medicine has selected and declared them eligible based on physical, psychological and medical examination. The entry examination held by the Academy consists of written tests in mathematics, social sciences and English language.

Until 2006 the Academy syllabus lasted four years, but has since been changed to three years to bring it in line with national and international standards. After the first theoretical year at the academy, students selected to become pilots are sent to the Air Force Application School at Boboc, where they start their curriculum during the summer period attending classes on theoretical aeronautical subjects. They also start flying the Aerostar/Yakovlev Iak-52, the *ab initio* trainer of the Romanian Air Force.

Following an exchange of letters between the governments of Romania and USSR, it was decided to manufacture the Yak-52 in Romania in large numbers. Except for USSR's DOSAAF paramilitary sport flying organisation, in the 1980s the only customer for the Yak-52 was the Romanian Air Force, which introduced the aircraft at the beginning of 1986 as the Iak-52. It operated the aircraft alongside the indigenous IAR-823 basic trainer within the Air Liaison Group based at Focsani airfield, at that time part of the Scoala Militara de Ofiteri de Aviatie 'Aurel Vlaicu' (Military Aviation School) at Boboc.

Since then, a few more air arms have followed the Romanian example, as well as many hundreds of civilian buyers. After more than 20 years since production started, the Romanian manufacturer Aerostar S.A. has produced more than 1,800 Iak-52s.

Today, the Boboc unit is subordinated to the Romanian Air Force Academy 'Henri Coanda', which took over all the assets of the former military school during the reorganisation process



undertaken in 1995.

Each student's flying skills is assessed during some 50 to 60 flight hours in the Iak-52, which includes basic flying training, navigation, formation and several solo flights. After the first year it is decided if the pilot will become a fighter pilot and continue on the IAR-99 Standard or become a transport or helicopter pilot. This is determined based on his or her performance, interest and - of course - the air force's pilot requirements.

Future transport pilots continue their course flying the Antonov An-2 'Colt', of which six are left in the inventory. Designated helicopter pilots transfer to the 206th Escadrila Aviatie Scoala (School Squadron) and fly the IAR-316B Alouette III. After a second year at the Academy the fighter-pilot student returns to Boboc for 50 more flying hours.

Basic training is given on the IAR-99 Standard, which includes navigation, formation, instrument training and, finally, solo flights. This training is continued in the third year when the focus

is more on formation and aerobatics. After graduation from the Air Force Academy the cadet becomes a first lieutenant, receiving his or her long awaited pilot license. The young graduates continue to fly the IAR-99C Soim as the lead-in fighter trainer for the LanceR.

In 2004 the Romanian Air Force started with three Soim aircraft and five instructor pilots to establish and develop a training syllabus for this advanced training course in order to economise its training and close the gap between IAR-99 Standard and MiG-21 LanceR. The final six or so Delfins were retired in November 2005 and placed into storage at Ianca.

In 2006 the first four fighter pilot students were trained on the IAR-99 Soim, but the remaining student pilots still received their training on the IAR-99 Standard and L-39. From 2008 onwards, all students received their advanced pilot training on the IAR-99C Soim, for which the 204th School Squadron had nine aircraft in its inventory and ten instructor pilots.

*Marnix Sap and Carlo Brummer/MIAS.Aero*