



Wings of Change

The Air Corps is currently undergoing a long awaited re-equipment programme for both its fixed and rotary wings the latter of which is receiving its fair share of publicity in recent times. SIGNAL hears the views of Lt. Col. Paul Fry of the Air Corps on the programme.

One of the most striking things about a visit to Baldonnell is the air of expectancy with which the personnel involved carry out their business. It would be expected that the instruction of trainee pilots in almost 25 year-old aircraft would have a debilitating affect on moral, not to mention the recent controversial delay in the procurement of medium lift craft for the rotary wing. But not so. The various roles and obligations of the Air Corps are fulfilled with that sense of optimism that great change is just around the next corner. Lt. Col. Paul Fry, Officer Commanding Air Corps College with responsibility for pilot training is a prime example, with an unlimited

knowledge and ardour for both the role of the force and the equipment needed to accomplish that role. He is frank about the difficulties faced by the Air Corps in the past and upbeat, in a quietly confident way, about what lies in store for his charges in the future.

"We are in a difficulty with the training aircraft at present," he says, "and things have got decidedly worse since the mid-90s. Currently we're doing our best to put a pilot training programme together. We are in particular having problems with Advanced Flight Training (AFT) and have to monopolise the aircraft. For advanced training we are using the Gazelle (a 5-seat lightweight turbine powered utility and pilot training heli-

copter) and the King Air (a Beechcraft Super King Air 200 twin-engined 8-seat transport aircraft). Basic training is taken care of with the Marchetti (the SF260WE piston-engined basic trainer aircraft having a weapons training capability) but even that is becoming a problem."

With the Marchetti's approaching 25 years of age, it is easy to see the difficulties Paul Fry and his colleagues face.

"They aren't unsafe or unreliable," he explains, "it's just at that age, more and more effort and spares are required to keep them airworthy, as you would expect of any mechanically-propelled vehicle of that age. In fact the Marchetti's are older now than the Chipmunks and the Vampires were when I



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joined the Air Corps and they were old then, having been in service since the mid-50s."

The Air Corps did have a three-aircraft training system; elementary flight training was done on the Chipmunk, basic training on the Provost and advanced training on the Vampires. In the mid-70s there was a large-scale procurement plan for the Air Corps when the Fouga's, the Marchetti's, the Gazelle's, King Air's, an executive jet

"That led to us having to change our standards in terms of training," Paul Fry recalls, "since the Marchetti is a lot faster than the Chipmunk. The Marchetti is also a very aerobatic craft and can carry a full armament payload." One of the major problems for the Air Corp was, and still is, that there was not enough suitable aircraft to complete training to a satisfactory level.

"There was a high failure, or washout,

considerably thanks to their computer-based skills measurement and aptitude tests. As it stands our success rates compare very well internationally, the RAF would have similar failure rates. It is always a challenge to get enough flying hours for our pilots with the aircraft that we have, they each have to clock up 150 hours flying time."

Another drawback with the Marchetti concerns its instrumentation which are simply not available any more. This situation, which hopefully will be short term has seen some ingenious solutions by the Air Corp.

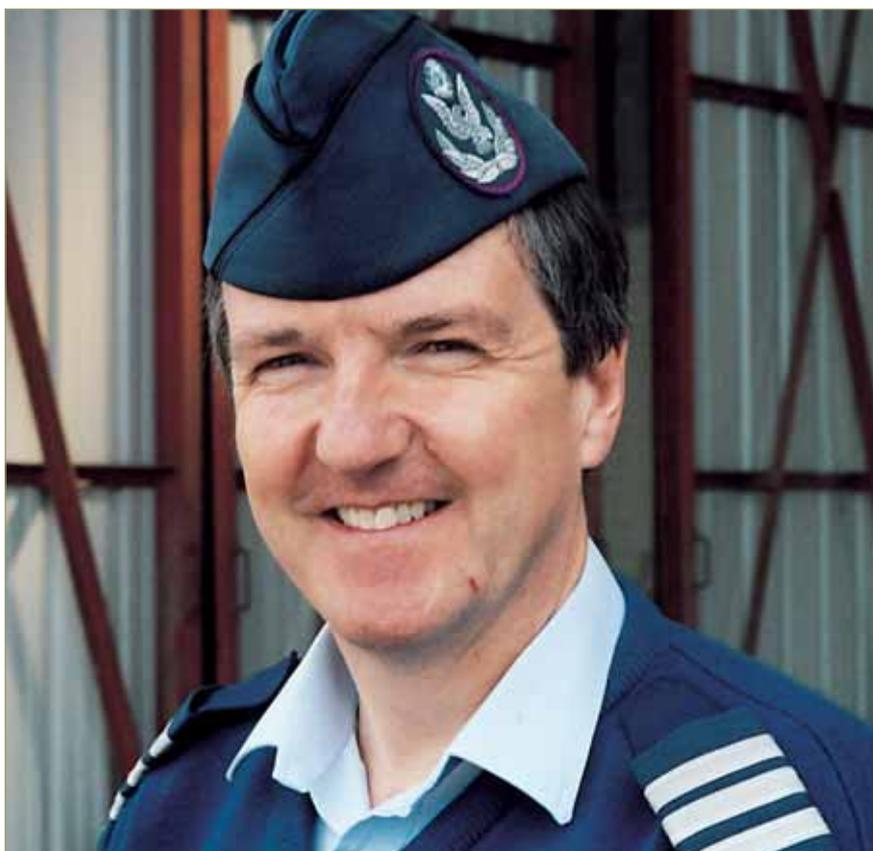
"My predecessor in the Flying School, Comdt. Jim Duffy, and the Officer in charge of the Avionics Squadron Comdt. Ray Flanagan," says Paul Fry, "got together and they designed a new instrument panel incorporating a modern instrument "suite" for the aircraft. This new panel was cut-out from a "blank" panel supplied by SIAI Marchetti, had its instruments installed by Avionics Squadron, was test-flown by the Flying Training School Staff Officers and was ultimately approved for use by the original aircraft manufacturers.

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were purchased and a Puma was leased. All this was done in the space of seven years, with the Corps acquiring in the region of 42 aircraft. But crucially the aircraft for elementary training were not replaced. Since then the Marchetti's have been used for both jobs.

rate," explains Lt. Col. Fry. "We were failing up to 50 per cent of our candidates every year, so expansion within the Air Corp was very difficult. We got in touch with Park Aviation in the late 80s. They understood the problems that we were having and with their assistance, the failure rate has decreased



obscure parts is really quite admirable to say the least. As Paul Fry takes SIGNAL on a tour of the various hangars housing the Air Corps' fleet it is obvious what they have had to contend with over the years has been less than satisfactory. Their work is a lesson in the true spirit of 'adapt, improvise and overcome.' It has turned out to be a lengthy process, considering the age of the aircraft but they have persevered.

"Obviously this is not a long term solution," says Paul Fry, "nor is it an economic one, the cost of parts has basically trebled in the last four years."

One example he points to by way of explanation are the mounting points on the Marchetti for the engine with which they have had some problems. While these could be bought quite quickly for \$12,000 each, they now cost \$27,000 apiece and there is a six-month waiting list making the Marchetti an extremely expensive aircraft to maintain.

But hopefully such practices are a thing of the past with placement recently of a public information notice (PIN) in the EU journal for the procurement of €27 million worth of aircraft. The Air Corps have therefore set out a syllabus in advance of procur-

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Lieutenant Colonel Paul Fry, Officer Commanding Air Corps College and Commandant John O'Keefe, Chief Helicopter Instructor

ing the new aircraft which will enable them to complete their training syllabus, most notably in terms of advanced flight training. The syllabus for the three training levels are:-

- Elementary Flight Training (EFT): Control and manoeuvre exercises (turns, climbs, descents, stalling, spinning aerobatics, take-off and landing.

mentary and basic flying roles while also enabling completion of advanced training. The aircraft must conform to a number of standards. It must be able to operate above 10,000 feet which is vital for AFT. While the Fouga Magister was capable of this it has since been retired. The Marchetti is not designed to work above 10,000 feet. The air-

The challenge for the Air Corps is to find an aircraft that can do as much of both the elementary and basic flying roles while also enabling completion of advanced training.

- Basic Flight Training (BFT): Expand on elementary skills and introduce and develop navigational day and night capabilities and instrument and formation flying.
- Advanced Flight Training (AFT): Further expand skills to a level to enable transition onto operational fighter, transport aircraft or helicopter by taking basic skills to high altitude and high-speed corners of the flight envelope.

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craft must also be weapons capable for a wide variety of ordnance. It must be able to land at speeds close to that of the Marchetti. The Fouga Magister was a high speed, high altitude craft and any replacement must possess the same capability. The cockpit technology must also be 'future-proof' or equipped with modern equipment.

"After considering a number of solutions," Paul Fry elucidates, "we decided upon turbo-prop aircraft. There are three on the market that we are looking at. The Pilatus

Contender No.1

Embraer Super Tucano

Manufactured in Brazil, the new multi-purpose Super Tucano was developed for training and operational missions from remotely located, unprepared airfields deprived of support infrastructure. Latest generation digital avionics, including head-up display (HUD) and a computerised weapons management system, accompany a night vision system, an onboard oxygen-generating system (OBOGS), and built in test equipment for easy fault identification and repair. Each underwing station features a Stores Interface Unit (SIU) that recognises loaded armaments and their status.

The SIU is capable of performing several tasks such as armament selection and release control. The aircraft is available in single and two-seat versions, with the dual pilot variant featuring a forward-looking infrared (FLIR) system under the fuselage to give it night surveillance and attack capability. Embraer has formally begun selling its Super Tucano trainer and light attack turboprop outside Brazil and has stepped up its marketing of the \$5.5 million turbo-prop. According to Embraer CEO Maurício Botelho it is an aircraft designed for border surveillance and counter-insurgency operations. The Brazilian government has placed 76 firm orders and taken 23 options for the aircraft they call the ALX, which has an all-glass cockpit by Israel's Elbit.

Last summer they sold ten Super Tucanos to the Dominican Republic for missions including training and drug interdiction. The Super Tucano has a PT6A-68/3 engine from Pratt & Whitney, Canada generating 1600 shp. The attack version has a pair of 50-caliber wing-mounted machine guns as well as hardpoints for bombs, rockets and missiles (including Sidewinders and potential for Python 4) and a computerised weapons management system. Some 700 of the new trainer-fighter's predecessor, the EMB 312 Tucano, have been sold worldwide. The first Brazilian Super Tucanos will be delivered in December 2003, along with the first export examples. Embraer can build six Super Tucanos per month at its new purpose-built production facility.

Contender No.2

Pilatus PC-9M

The PILATUS PC-9M Advanced Turbo Trainer continues to represent the top of the turbo trainer class offering the highest performance and excellent handling characteristics, advanced instrumentation and a greater range in training effectiveness. With over 230 aircraft sold to twelve military customers, the PC-9M is well established as the advanced pilot trainer.

The PC-9M is built upon the experience garnered with the PC-7 and PC-7Mk II M with whom it shares high manufacturing quality, high reliability and low operating cost. It led the way in convincing training commands of the advantages of turboprops for a training aircraft. This is apparent by virtue of the fact that the PC-9M has been selected by some major air forces and navies as their new

trainer aircraft. The PC-9M features modern avionics including a Head Up Display (HUD) with mission recording capability and a HUD repeater display in the rear cockpit. It also incorporates a variety of aerodynamic changes giving even better handling characteristics.

The manufacturer's claim is to offer an aircraft designed to fit the needs of future air forces, with jet capabilities at turboprop costs and with Pilatus "Swiss made" precision and quality. The Pratt & Whitney Canada PT6A-62 engine is a free turbine turboprop engine with full acrobatic capability including 60 seconds of inverted flight. Flat rated from 1150 SHP to 950 SHP (max.), the engine offers sufficient power to cover basic and advanced training demands.

PC-9 which has a 900 hp engine, the Embraer Super Tucano with a 1650 hp engine, which is an interesting craft. The Brazilians, who developed it, came up with a solution to a problem they had in terms of the cost-effectiveness of training their pilots. They realised that it was costing too much to train their pilots on the fighter jets, which can cost up to \$4,000 an hour to run in the air. The Tucano is less than \$400 per hour. Following on from this they incorporated all the features of their fighter jets into the cockpit of the turbo-prop trainer."

This is a training system known as LIFT (Lead-In Fighter Trainer), the high end of the turbo-prop training market. "It's an excellent system," says Paul Fry, "with a very powerful engine and complex cockpit which its LIFT role requires. This cockpit may be too complex for the efficient conduct of basic flying training procedures for which we will employ the aircraft. The last candidate is the Raytheon T-6A, an American aircraft. This is very similar to the Swiss Pilatus PC-9. This aircraft came



The versatile Alouette helicopter which has given a long service to the Air Corps.



Rear view of a Gazelle, purchased in the 1970s.

Contender No.3

Raytheon T-6A

The Raytheon T-6A is a single-engine, two-seat primary trainer produced by Raytheon Aircraft and is a military trainer version of Raytheon's Beech. Stepped-tandem seating in the single cockpit places one crewmember in front of the other, with the student pilot in the front seat and the instructor pilot in the rear. A pilot may also fly the aircraft alone from the front seat. Pilots enter the T-6A cockpit through a side-opening, one-piece canopy that has demonstrated resistance to bird strikes at speeds up to 270 knots.

The T-6A has a Pratt & Whitney Canada PT6A-68 turbo-prop engine that delivers 1100 shp. The aircraft can perform an initial climb of over 1000 meters per minute and can reach almost 5500 meters in less than six minutes. The aircraft is fully aerobatic and features a pressurized cockpit with an anti-G system, and an advanced avionics package with

sunlight-readable liquid crystal displays. Before being formally named in 1997, the T-6A was first identified in a 1989 Department of Defense Trainer Aircraft Master Plan as the aircraft portion of the Joint Primary Aircraft Training System, or JPATS.

The system includes an integrated suite of simulators, training devices and computer management system. In the US it is used to provide the basic skills necessary for joint specialised undergraduate pilot students to progress to one of four training tracks: the Air Force bomber-fighter track, the Air Force airlift-tanker or Navy maritime track, the Navy strike track or the Air Force-Navy helicopter track. Instructor pilot training in the T-6 began at Randolph Air Force Base, Texas in 2000. Undergraduate pilot training began in October 2001 at Moody Air Base, Georgia.

about from a competition called Joint Primary Aircraft Training System (JPATS). They took a PC-9 and re-engineered it to meet their own standards. It boasts a 1250hp engine and has a pressurized cockpit. The cockpit itself is a fine example of what is required of a elementary/basic flying training aircraft with modern instrument displays logically laid-out. Like the PC9M and Super Tucano this aircraft is equipped with ejector-seats to enhance crew survivability and this represents a step back into the right direction as our old Fouga's did not possess such a safety system for the crew. Beech/Raytheon have certainly done a great job designing and building a fine pilot-training system for the USAF and US Navy, with over 700 on order in total."

Specifications

The turbo-prop specifications that the Air Corps specified are detailed as follows:-

- They required a turbine engine for high power output (750 shp to 1650 shp) enabling use of medium or high altitudes up to 30,000.
- The aircraft needs to have a high dive speed and MACH number and high cruise speed, as close as possible to that of the Fouga Magister jet.
- All are to be weapons-capable with a variety of guns, rockets and fuel drop tanks capable of being mounted under the wings.
- They should also have weapons sighting systems including air-to-air predicting facility restoring the ability to train in this role ahead of any operation
- The turbo-prop is also required to be very fuel efficient, giving internal fuel endurance of 3.5 hours which exceeds that of the Marchetti by 1 hour and by two hours in the case of the Magister.
- Safety features, such as the inclusion of ejector seats, are also to be included.
- The range of the turbo-prop should be able to be extended via underwing fuel tanks and maintenance made easier with modular design systems.

It is hoped that tenders for the new aircraft will be submitted by mid-May and from then, Paul Fry is optimistic that a deal can be done with a manufacturer by the end of 2002.