



**Martin-Baker**

# escape

THE NEWSLETTER FROM MARTIN-BAKER AIRCRAFT

APRIL 2011

EDITION 26

LIVES SAVED TO DATE	7345
LIVES SAVED IN 2011	7

**FOCUS ON PEOPLE  
A CHAT WITH PETER LEWIS**

**50<sup>TH</sup> ANNIVERSARY OF FIRST  
ZERO/ZERO TEST EJECTION**



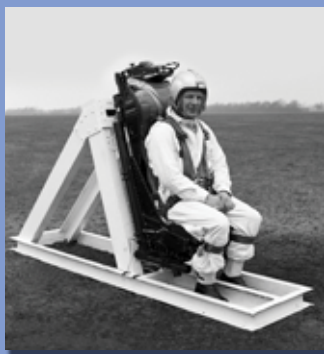
**Welcome to the 26th Edition of Escape**

As this issue of Escape goes to press, I cannot help but anticipate that this will be another year of milestones for the company, for example in our seat for the Joint Strike Fighter. In its history, Martin-Baker has celebrated many milestones; events of which we have been and can all still be very proud. Fifty years ago today, Doddy Hay, an ex RAF parachute instructor, became the first person on the planet to carry out a live zero zero ejection seat test. On that eventful day, history was made and both Martin-Baker and the world's press communicated the feat around the globe. This breakthrough was a landmark event for the company at the time and opened the door for Martin-Baker into new aircraft and new markets.

Another momentous breakthrough for this company occurred before ejection seats were even developed when the founder of this company, Sir James Martin, designed a part for the Spitfire Hood Jettison—a part still manufactured today over seventy years later.

In the spirit of this issue and some of the significant developments throughout our company history, we are aiming to archive Martin-Baker memorabilia and ultimately create a museum chronicling our amazing past, present and future. As such, I ask that anyone who has in their possession memorabilia relating to Martin-Baker's history share their finds with the rest of the company. I am looking forward to seeing what materializes from our search.

I conclude, however, with the thought that, although momentous events and significant developments such as these mentioned here, are what we remember when we look back on our company's history, our daily work is history-making in itself. We are, after all, saving and protecting lives every day.



**ON THE COVER**

On April Fools Day, 1st April 1961, Martin-Baker conducted the world's first zero speed, zero altitude ejection with a live subject. The image on the front cover shows Doddy Hay, an ex RAF Parachute Instructor, who was pictured before the first zero/zero test ejection took place – 50 years ago to this date.



Gerald Howarth, Minister for International Security Strategy, visited Martin-Baker earlier in the year for a brief on the company and its activities. He commented that our company is an export success story for the UK and that we have the full support of the Government in our endeavours.



During the week of 7th – 11th March, the Martin-Baker training school carried out what is believed to be the first "Full Length" seat maintenance course for internal personnel. The course covered T-38 "I" level (2 year) maintenance activities culminating in an end of course examination that was passed with flying colours. The students were awarded the same certificate of competence that has traditionally been reserved for customer attendees. The four students were Mark Ross, Chris Gamble, Robert Graham and Neville Parsons from the repair section in the Final Assembly Department and they were instructed by one of Martin-Bakers Technical Instructors – Ian Swift. When asked about the training, all the attendees said that it had been worthwhile and enjoyable.

It is felt that this form of training is essential in today's business climate and it is also rewarding for the students who glean further knowledge about the products that they regularly assemble or repair. A further training course has already been scheduled for May. It is hoped that these courses are the start of many more in the future.



During Aero India, Anand Kumar (IAF) visited the Martin-Baker stand. Anand ejected on 18th November 2007 from a Kiran aircraft and has recently become a member of the Ejection Tie Club



Picture L-R: Dr Graham Rood (FAST) Julie Goddard, Charles Sainson & Geoff Millward.

**Human Engineering Department Views the Development of Aircrew Flying Clothing**

Recently, three members of the Human Engineering Department; Julie Goddard, Charles Sainson and Geoff Millward, visited the Farnborough Air Sciences Trust (FAST). They were given a tour of the museum and its displays (including an exclusive viewing of the fascinating Cody aircraft replica) by FAST's Dr Graham Rood, who also outlined the development of military aircrew clothing over the years.



Going into its second year, the US16T seat assembly team at Martin-Baker America have produced just over 240 US16T seats to support the ESUP field teams. Along with assembly and testing of seats the team also assembles and tests the Seat Pan and Mech. Assemblies.



Martin-Baker Drawing No SH51

*Extract from Reach for the Sky by Douglas Bader*

Douglas Bader was shot down on 9th August, 1941. As always, when things like this occur, one's mind remains clear. I pulled the little rubber ball above my head which jettisoned the cockpit canopy and away it went. Immediately things became rough and noisy with the wind roaring past and around the now open cockpit. I was held by my harness and I had no difficulty in moving my hands. I thought I might have difficulty in getting out of the cockpit in this attitude of the aeroplane and at this great speed. I pulled the harness pin, and it was as though I was sucked out by a large vacuum cleaner to the accompaniment of tremendous noise and buffeting. My helmet and goggles were wrenched off my head and then to my final discomfort I found myself attached to my Spitfire, but outside it.

The ground below was the farm and grazing land of northern France. A man wearing a peaked sort of railway porter's cap and a blue smock, carrying on his shoulders a yoke to which were attached two buckets, was opening a gate between two grass fields. A woman with a scarf was with him. As he opened the gate, he noticed me about 800 feet above and in front of him. They both remained motionless, staring. I then realized my appearance was a bit odd. My right leg was no longer with me. It had caught somewhere in the top of the cockpit as I tried to leave my Spitfire.

Martin-Baker in 2011 continues to manufacture and hold stock of the Spitfire Hood Jettison Rubber Control Knob, which now is used as a component of ejection seat Ground Support Equipment. The most recent delivery was to Sweden in 2010.

The drawing is dated 25th January 1941 and signed by Sir James Martin. It has given 70 years of service.

## TEAM SPOTLIGHT...TECHNICAL PUBLICATIONS

It's highly likely that everyone in the Company has used or referred to documents or information generated by the Technical Publications Department. Whether it's referencing technical information to maintain or test an ejection seat or a casual visit to the website.

The Department maintains and manages hundreds of technical publications and documents in use by our customers and partners, as well as in-house departments such as Final Assembly, the Fitting Annex, Experimental and the Training School. Typically, ejection seat information is published as a five volume suite with around 1400 pages, ground support equipment information as individual manuals, and acceptance test procedures and build plans as single documents. Additionally, there is a significant, year on year requirement for new manuals and documents based on the Company's ongoing sales success.

Our highly detailed and comprehensive technical publications, presented on a variety of media, ensure our customers realise the life-cycle reliability inherent in our Company's innovative designs. Authors and Illustrators gather, analyse and present data, sourcing from all areas of the Company, including engineering, design and test; detailing all maintenance, operation and repair activities, which guarantees autonomy of support for the customer in the field. This, coupled with a robust, periodic update strategy, ensures the latest information is always available to the user at the "sharp-end".

In continuing to drive down costs, the Publications Department is about to launch the Martin-Baker Digital Hub. Designed in partnership with our Website provider, the Hub will offer our customers individual or group access to a secure Internet portal for all manner of Martin-Baker data; from immediate notification of important safety advice to deploying long term reference information, such as training materials. It offers both the Company and our partners a modern interchange environment with which to establish new, and maintain existing, relationships with our customers. 24/7 global availability combined with a customisable user journey ensures a personal, but relevant and efficient experience for all.

The Technical Publications Department's capability in high specification graphical design and printing offers the whole Company a ready source of uniquely branded literature covering our complete product suite. All of which provide our customers with all the necessary information to upgrade or add to their Martin-Baker portfolio. Exhibition backdrops, datasheets and posters, alongside more practical applications such as record cards and labeling, even replacing the roundels on one of the Meteors; our range of support is limitless, and all at a considerable cost saving compared to historical methods of graphical based procurement.

With, some would say, an unhealthy appetite for all things technical, design and publishing, the ever increasing demands on our diverse skill-set constantly adds value to all parts of the Business. Highly motivated and professional, the Tech Pubs Team is always ready to meet any challenge with boundless effort and commitment ensuring the Company's continued success.

Picture L-R: Alex Stirling, Dave Lin, Phil Coles, Scott Sivyer, Dave Pearce-Twose, Paul Bird, Chris Morgan, John Clarke, Mike Lam, Mike Good, Richard Lane, Paul Denton, Norman Street



## EVENTS AND EXHIBITIONS



Aero India February 2011



SAFE Europe April 2011

### FUTURE EVENTS:

SAFE Europe – Stockholm, Sweden – 5-6 April 2011

Utility Helicopters International Users' Conference – Florida, USA – 9-12 May 2011

Paris Air Show – Paris, France – 20-26 June 2011

## A CHAT WITH...PETER LEWIS, HEAD OF OPERATIONS

Do you remember the date you started at Martin-Baker?

25th March 1985

What is your greatest achievement at Martin-Baker?

It's difficult to highlight one thing because I have been involved in so many projects and all the major achievements have been a team effort anyway. Setting up Johnstown, introducing SAP and building an effective Operations Management team are major activities that come to mind.

What do you like best at Martin-Baker?

I like the lack of bureaucracy and the "can do" attitude when faced with a challenge.

Are you married/children?

I am married to my second wife Pauline who I met in 2002. I have two sons, Matthew aged 19 yrs who is currently at Edinburgh University studying Civil Engineering and Daniel aged 15 yrs who lives with his mother in Bourne End. I also have two step children, Jasmine and David.

Do you have any particular hobbies?

I have belonged to a Martial Arts club (Korean Taekwondo) since 1999 and I train with them two or three times a week. I also follow Motorsport, particularly motorcycle racing and I have a Honda Fireblade which comes out of the garage on warm dry days and occasionally goes to track days. I am a keen Scuba Diver and I am also interested in military history which I think holds many lessons. I enjoy relaxing with my wife, eating out, drinking good wine, and travelling whenever we get the chance.

What is your all time favourite movie?

Butch Cassidy and the Sun Dance Kid.

What do you think are the challenges ahead for Martin-Baker?

Delivering products and services on time is an ongoing challenge. We have got a lot better in recent years but there is still more to do. In the longer term we need to constantly adapt the company's capabilities so we can exploit opportunities that arise in a changing world market.





# ZERO -

*On All Fools Day, 1st April 1961, Martin-Baker conducted the world's first zero speed, zero altitude ejection with a live subject. This is the story of the trials and tribulations leading up to this demonstration. The first-hand account of this story is told by **Brian Miller OBE** who was then a junior member of Martin-Baker's pioneering team developing the first rocket powered ejection seat.*

I originally started at Martin-Baker as a Junior Technician on the 9th January, 1961. Shortly after joining, Mr James Martin, the Chief Designer and Managing Director (who was to become Sir James four years later) appeared by my desk and asked who I was. I explained and, after a pause while he weighed me up, he said "If you're any good, you can do well here." He then added rather ominously: "If you're no good we'll sack you in a month!" Pep talk over, I got down to work.

Until that time the seat and occupant had been propelled from the cockpit by a three-tube telescopic ejection gun. This unit was mounted behind the seat with the inner piston tube attached to the top of the seat and the outer cylinder tube to the cockpit bulkhead.



When the occupant pulled the seat firing handle, a cartridge in the piston tube was fired pressurizing the telescopic tubes, unlocking the seat from the aircraft. As the pressure increased, the tubes extended rapidly ejecting the seat from the aircraft. To maintain the internal pressure, the earliest seats had an additional cartridge fitted that fired as the tubes extended. To achieve the capability to propel the seat high enough for ejection at ground level with an aircraft speed of 100 mph, a further cartridge was added. With the introduction of high speed bomber aircraft, with high tailplanes, the number of cartridges had been increased to a total of 5.

With this development it was clear that the ejection gun could be developed no further, as the forces applied to the ejectee were at the limit of human tolerance. Lengthening the gun was impossible due to the strong bending loads, especially during ejection at high speed, so the only practical way to obtain more performance was to add a rocket that would augment the initial thrust provided by the gun. A major cause of fatalities was ejections at low altitude, such as when an emergency occurred during take-off or landing. Adding a rocket promised to save aircrew under these extreme conditions. The seat would have so much power that pilots would even be able to eject standing still on the ground, under zero speed, zero altitude conditions. The immediate question that needed answering was what would be the effect on the human body? This question had arisen since the Company started developing ejection seats in 1944. Once again the ultimate answer would be to test the rocket seat with a live subject, but before that the whole concept of rocket ejection had to be explored.

To expedite early testing, it was decided to use an existing RAF rocket motor, consisting of a steel tube (about a metre long and 65mm in diameter) that contained a solid propellant. The tube was closed at one end and had a nozzle at the other and two motors would be required to power the seat.

The next big problem to solve was stability. It is obviously easier to pull something than to push it – try pushing a length of rope! It was therefore logical that we tried to use the rockets to pull the seat rather than push it. A test was set up at Chalgrove and the rockets were tethered to the top of the seat by steel chains. The rockets roared upward at tremendous speed, dragging the chains upward until they became taut and snapped. Luckily the rockets fell harmlessly in the empty car park of the Lamb pub in Chalgrove village! It was obvious that we would never be able to make this a practical system. The much harder solution of pushing the seat would have to be adopted even though it presented enormous technical challenges.

The rocket motors were mounted on the back of the seat, and the nozzles redesigned to direct the hot exhaust through an elongated S-bend beneath the seat pan. As the resultant exhaust was in-line with the centre of gravity (CG) of the seat and occupant, a practical means of rocket assisted escape had been achieved, so testing could now begin in earnest.



# -ZERO

The Experimental Department, managed by foreman Gerry Moss, produced the hardware and two skilled fitters, George Purser and Arthur Bates, took the seat and dummy down to Chalgrove for testing.

With a great deal of skilled engineering and painstaking development the seat was brought to a reliable standard and was ready to answer the big question – could a man tolerate the force of rocket seat ejection? Our test data was encouraging and indicated that the forces were tolerable, but the Air Force doctors could not say if it was acceptable because no one had ever been ejected with a rocket before! So once again James Martin made the decision to conduct a live test, as it was the only way to confirm that the system was safe. He contacted ex-RAF parachute instructor, Doddy Hay, who had already tested our rearward facing ejection seat from a Valiant jet bomber at Chalgrove four years previously.

Doddy came to Denham and, dressed in his white flight suit, helmet and boots, was strapped into the ejection seat and measurements taken to determine the exact location of his, and the seat's, combined CG. Peter Hodgekiss was entrusted with this responsibility upon which rested Doddy's safety. Initially the results appeared to be wrong because the CG was different to all the others we had measured. Eventually Peter determined that it was Doddy's heavy, thickly studded, "lucky jumping boots" that were throwing out the measurements. As he would not change them for the test, the seat had to be specially modified to accommodate him. During this visit Doddy mentioned that he had never actually seen a test of the rocket seat, other than on film, so arrangements were quickly made for him to witness a demonstration test at Chalgrove the next day.

The equipment was rapidly assembled for this unexpected demonstration and Doddy arrived smartly turned out in blazer and RAF tie. As on many previous occasions, George and Arthur prepared the seat while I installed the recording equipment. I then stood next to Doddy and Eric Stevens, as Arthur counted down and pulled the seat firing lanyard. After the initial acceleration on the ejection gun, one of the rocket motor manifolds exploded loudly. Powered only on one side, the seat rotated sideways uncontrollably, like a Catherine Wheel. This resulted in the seat wrapping itself in the deploying parachute and crashing to the ground just feet from us. We were transfixed and I looked at Doddy expecting him to be heading for the gate. Instead he calmly extracted a cigarette with a steady hand, tapped it, lit it, took a long draw, blew out the smoke and said: "I hope that doesn't happen on Saturday!"

Saturday 1st April  
Wing Commander John Jewell, the Service Manager briefed the service representatives and Brian Limbrey, his deputy, briefed the reporters.

At the appointed hour Doddy strapped into the seat and photographs were taken. The seat was then armed, the safety pins removed and the signal given to fire the seat. Doddy reached up, grasped the firing handle above his head and pulled the face curtain down over his face to fire the seat.

Nothing happened! Doddy was now faced with a dilemma. If the seat fired as he was getting out he would probably be killed, as would anyone trying to assist him. Still holding the face curtain with one hand, he carefully undid his leg restraint garters and survival pack connector. In one final fluid movement, he released his harness, and was up and away from the seat. After the hazardous job of making the seat safe, George Purser and Arthur Bates found that a tiny burr on the threads of the firing unit had prevented it going fully down when screwed into the top of the ejection gun. As a result, the firing pin had not struck the percussion cap with sufficient force to fire the cartridge. Brian Limbrey explained what had happened to the reporters and asked them to focus on the historical demonstration that they were there to witness. To their credit not one of them reported this initial problem.

The fault was remedied, double checked, and Doddy courageously strapped himself in again. This time everything worked perfectly and Doddy soared upward on the rockets. Still speeding upward the stabilizing drogues were deployed, rotating the seat so that he was now inverted. The drogues released from the seat to extract the parachute and, as it blossomed, the seat separated and fell clear as Doddy swung down under his parachute. He quickly dropped his survival pack and brought his swinging parachute under control. He made a perfect parachute landing, rolling to the side and back onto his feet in one fluid move. He had already collapsed his parachute by the time the excited spectators, led by Mr Martin, reached him. History had been made on that grey April morning and the media splashed our success across front pages and television screens around the world.

The mental stress associated with these live tests was enormous and everyone involved felt the strain. However the largest burden by far rested squarely on the shoulders of James Martin who was putting the Company's reputation and future, as well as a man's life, on the line. Many years later he said that when such a test was completed, he felt as if a great weight had been lifted from his shoulders and he could have lain down and slept for a month.

This demonstration proved that the concept of a rocket ejection seat was viable and that the forces on the human body were entirely acceptable. Indeed, the addition of the rocket enabled the thrust of the ejection gun to be reduced to virtually eliminate the risk of ejection related injury. Pilots who were later to make emergency ejections with both types of seat, reported that whereas the ejection gun powered seat delivered a violent kick, the rocket seat gave a powerful push.

The failure of one motor on the demonstration for Doddy had confirmed that we would need to design a special single motor to fit under the seat, so that should it fail the seat would still eject safely, but with less performance.

I had the great satisfaction of seeing the rocket seat into service, which began saving aircrew lives under conditions which would have been impossible with the old seat. It enabled me to witness history being made.

# COMPANY IMPROVEMENTS PROJECT

On the 3rd of March, a group of 22 employees gathered to be presented with Certificates recognising their success in completing NVQ BIT (National Vocational Qualification – Business Improvement Techniques). The photograph was taken at the end of the presentation of the individual certificates.

The programme of training, now in its third year, has seen a total of 113 employees complete the training, which is an impressive achievement and which is further enhanced by 15 also being successful at level 3. A further group of 20 employees are being trained at Denham & Chalgrove at the time of going to print. Improvement programmes have included many changes to our manufacturing processes and technical publications (other areas include Sheet Metal, Welding, Machine Shop, Final Assembly Pyro Production, Inspection, Technical Publications, etc.). The feedback from participants has been consistently positive, with many people expressing satisfaction for this form of practical training and its application to make measurable improvements.

The current programme at Chalgrove has a focus on the cartridge assembly. Following the theoretical training on 5S, 8D, herring bone diagrams, etc. the teams will identify what improvements are available, plan an approach to resolving them and implement the solution as a project within the course.



L-R John Martin, Kevin Breakspear, Barry Sills, Martin Roche, Gulamonabi Mahomed, Jamie Lomas, Patrick Saines, John Reclik, Darren Smith, James Kennedy, Kevin Spink, Clare Dickson, Michael Greene, Adrian Hull, Trevor Whelton, Mark Widdows, Emmanuel Dua, David Harwin, Mark Ross, Colin Woolman, Ian Lambert, David Pickstock, Dumitru Lupu, Jim Martin.

# CHALGROVE IMPROVEMENTS



The Martin-Baker plant at Chalgrove is undergoing a 2 year expansion project with the 1st of 3 stages already completed.

### Stage 1

- New canteen facilities to incorporate dining for up to 60 personnel located in the main hanger.
- Toilet facilities for male, female and disabled, including shower facilities.
- 2 conference rooms, seating parties of 6 and 12 and also a new refurbished board room.

### Stage 2

- Refurbishing the old offices upstairs in the warehouse, this will allow Pyro office staff to move from the main production site with possible expansion plans in manufacturing for 2011.

### Stage 3

- Increase Pyro Manufacturing capacity (TBC)



# ENVIRONMENTAL NEWS

In line with its environmental policy, trimming back of various trees and shrubs has been carried out before the main bird nesting season gets underway. However, trees in the car park have been damaged by the severe winter weather over the last few years, including some of the larger species and others have died.

Following consultation with our landscape company and a tree specialist, a programme of works to improve both the appearance of the site and the general environment in and around the trees has been drawn up. The work on the larger trees has been agreed with the Local Council in accordance with existing Tree Preservation Orders and the programme will be carried out in various stages throughout the year. This will result in a much improved natural environment throughout the car park over coming years.

# NEW STARTERS



David Quirk  
Packing



Sarah Jeffery  
Business Development



Stuart Ive  
PED



Sylvain D'Amato  
Quality



Owen Butler  
Explosives



Scott Kennedy  
PED



Hugh Lawrence  
Programmes



Stephen Storey  
TEC



Natalie Trott  
Human Resources



Orawan Jill Srisaowon  
Fitting Annexe



David Wilson  
Inspection



Todd McKay  
Sheet Metal



Pamela Murrison  
Shipping



Elaine Steward  
Human Resources



Karl King  
Finishing

# FOCUS ON PEOPLE



**Geoff Millward retired at 65 on Friday 11th March after joining the Company just over ten years ago. In this time he has assisted greatly in the development of survival equipment for most major Mk16 seat programmes.**

**Geoff will continue to work for the Human Engineering Department until August in order to finish the JSF HED test programme.**



Having competed in athletics for many years Simon Duberty (Experimental Department) is now teaching his own Sprintech Training system to talented athletes at London's Brunel University.

The picture above shows Nigel Levine winning the Aviva Grand Prix at the National Indoor Arena, Birmingham. He is currently being coached by Simon for the Outdoor season where he hopes to compete in the forthcoming World Athletic Championships in Deagu, South Korea.

Nigel recently competed at the European Indoor Championships and, together with his training partner Nick Leavey, won a Silver Medal in the 4x400 relay. He finished his 2011 indoor campaign ranked number 2 in Europe.



Norman Bailey retired as Head Of Explosives (Chalgrove) after nearly 25 years service. Since he started in 1986 he has been instrumental in the development of quality and procedures within the department.



**A surprise party was arranged to celebrate Martin Roaches 50th birthday in March.**

**Martin, who works in Final Assembly and has been with the Company for 19 years, rolled back the years with family and friends at Windsors in Watford.**



Jim Dance (Fuselage Department) left the Company on 31st March after eleven years of service. Jim has worked on T-38, PC-21 and JSF as the main programmes but has worked on many others too. He has manufactured over 30 A frames in his eleven years with the section.



As sponsors of the Royal Air Force Typhoon Display Team, Martin-Baker Aircraft Company Ltd. and Bremont arranged for photographs of the team to be taken in action at their base at RAF Coningsby in Lincolnshire.

The first of these pictures is to be used in an advert to be featured in the RAF's display team magazine. The magazine is being published to launch the start of the 2011 season showing, amongst other information, details of all of the displays taking place in the UK.

We wish them all a great season.





## Kuwait Air Force

The Kuwait Air Force is the air arm of the State of Kuwait. The Air Force headquarters is located at Al Mubarak Air Base, with the remaining forces stationed at Air Defence Brigade, Ali Al Salem Air Base and Ahmed Al Jaber Air Base. The Kuwait Air Force numbers approximately 2,500 officers and enlisted personnel.

The current air force started as the Security Department of Kuwait which operated a number of Austers in different configurations and two De Havilland DH104 Doves. The Kuwait Air Force and Air Defence was formed in 1961 following an intervention by Britain that prevented Iraq from claiming Kuwait as one of its provinces. The first aircraft to enter KAF service were four Whirlwind helicopters and six BAC/Hunting Jet Provost T.51s (Mk 4P seats). This support from the UK would remain in place for a long time and 1964 saw the arrival of the first Hawker Hunters followed by more in 1969. The first De Havilland Canada type to enter KAF service was the DHC-4 Caribou which arrived in 1963. The transport capacity would later be improved by the acquisition of an ex-RAF Argosy in 1969 and later, in 1971, by two Lockheed L-100-20 Hercules. In the meantime the fighter force was given a boost by the procurement of twelve BAC Lightning F53s (Mk 4BSC seats) and two T55 (Mk 4BSB seats) trainer versions that were delivered in the late 60s. Twelve Strikemaster Mk.83s (Mk 4PB seats) were delivered in 1969. Between 1968 and 1977 two Bell 206s operated in KAF service and from November 1969, eight Augusta Bell 205s were delivered, replacing the aging Whirlwinds. Five years after the delivery of the Lightnings, the KAF decided it needed a more reliable aircraft. The Hunters and Strikemasters had been used in the interceptor and ground strike role, rather than the Lightnings. Finally in 1974 the Mirage F1 (Mk RM4 seat) was selected as the new air defence fighter and a total of 27 Mirage F1CKs and seven Mirage F1BKs were ordered and delivered in two separate batches until 1983. The ground strike role would be filled in by the total of 36 Douglas (T)A-4KU Skyhawks that were ordered in 1974 and delivered during 1977. 24 SA-342K Gazelles were delivered during the mid-70s and four were subsequently passed on to the Police Air Wing. Four L-100-30 Hercules transport aircraft were delivered in 1983, replacing the shorter L-100-20 version from which only one survived (one crashed in France). Also in 1983, twelve Hawk T64's (fitted with KT10B seats) filled the training gap.

In 1988 the Air Force was renamed al-Quwwat al-Jawwiya al-Kuwaitiyya (Kuwait Air Force).

The Shorts Tucano T.52 was selected as the lead-in-fighter-trainer and 16 (fitted with KT8LC seats) were delivered in 1995. They were earmarked for delivery in 1990 but due to the outbreak of the Gulf War, deliveries were postponed.

During the Gulf War the Kuwait Air Force aircraft were often scrambled, and approximately 20% were lost or captured. An air battle with the Iraqi helicopter airborne forces was fought over Kuwait City, inflicting heavy losses on the Iraqi elite troops and a few combat sorties were flown against Iraqi ground forces. The remaining 80% of the aircraft were then evacuated to Saudi Arabia and Bahrain, some aircraft even taking off from the highways adjacent to the bases as the runways were overrun. While these aircraft were not used in support of the subsequent Gulf War, the "Free Kuwait Air Force" assisted Saudi Arabia in patrolling the southern border with Yemen, which was considered a threat by the Saudis because of Yemen-Iraq ties.

After the Gulf War, the KAF underwent a reorganisation and both the Douglas A-4 Skyhawks and the Dassault Mirage F1s were soon phased out in favour of the McDonnell Douglas F-18 Hornet. 32 F/A-18Cs and eight F/A-18D Hornets are flying with 9th Squadron and 25th Squadron from Ahmed al Jaber. The Mirage was withdrawn from use and is in storage. Most of the remaining Skyhawks continued their operational life with the Brazilian Navy. The first six of sixteen ordered AH-64D Apache Longbow attack helicopters were handed over to the Kuwait Air Force on 3 February 2006. The remaining ten aircraft were delivered thereafter.

Lockheed Martin has received a \$245 million contract from the U.S. Government for the Foreign Military Sale of 8 KC-130J tanker aircraft to Kuwait and the program will be managed by the U.S. Navy. The Kuwait Air Force's new KC-130Js will provide aerial refueling for its F/A-18 fleet and will augment its current airlift fleet of three Lockheed Martin L-100s. Kuwait's KC-130Js also will perform air mobility, disaster relief and humanitarian missions throughout the world.

Martin-Baker is currently supporting the KAF by carrying out parachute and PSP packing here at Denham and NACES parachute packing at MBAI, Johnstown.



Zero/Zero test from an early Meteor. (Chalgrove)



Two Hawker Hunter aircraft and the Martin-Baker Dakota (Chalgrove)



Trial 3 seat ejection for Vulcan V Bomber. (Chalgrove)



Early photo of main Factory, staff in foreground working on Blast Tubes. (Denham)



Construction of main factory buildings, with the current Goods Inwards building in the background. (Denham)



Pictured 3rd from left in-front of an MB3 aircraft is Eric Stevens the first Martin Aircraft Works employee. (Denham)

## EJECTION REPORTS

Date: 17th November 2010  
Operator: Canadian Forces  
Aircraft Type: CF-18 Hornet  
Seat Type: NACES  
Where: Cold Lake, Alberta  
The pilot ejected successfully

Date: 27th January 2011  
Operator: Royal Air Force  
Aircraft Type: Tornado  
Seat Type: 10A  
Where: Gaitloch, Scotland  
Both pilots ejected successfully

Date: 28th November 2010  
Operator: French Navy  
Aircraft Type: Rafale  
Seat Type: F16F  
Where: Pakistan  
The pilot ejected successfully

Date: 10th February 2011  
Operator: Royal Air Force  
Aircraft Type: Tornado  
Seat Type: 10A  
Where: RAF Lossiemouth  
Both pilots ejected successfully

Date: 2nd December 2010  
Operator: US Navy  
Aircraft Type: F/A18C  
Seat Type: NACES  
Where: NAF El Centro  
Both pilots ejected successfully

Date: 25th February 2011  
Operator: Brazilian Air Force  
Aircraft Type: Super Tucano (ALX)  
Seat Type: BR10LCX  
Where: Rondonia  
The pilot ejected successfully

Date: 29th December 2010  
Operator: US Navy  
Aircraft Type: T-45 Goshawk  
Seat Type: NACES  
Where: Jefferson County, Florida  
Both pilots ejected successfully

Date: 1st March 2011  
Operator: Sri Lanka Air Force  
Aircraft Type: KFIR  
Seat Type: IL10P  
Where: 25 km from Colombo  
The pilot ejected successfully

Date: 26th January 2011  
Operator: Finnish Air Force  
Aircraft Type: F/A18C  
Seat Type: NACES  
Where: Tampere  
The pilot ejected successfully