



WORKSHOP



DH89A Dragon Rapide G-AKDW in its workshop at the de Havilland Aircraft Museum in early August. The wide door for parachuting or stretcher-loading purposes is quite unusual. KEY/BEN DUNNELL

NEARING THE FINISH LINE

There's been the odd setback along the way, but the de Havilland Aircraft Museum's Dragon Rapide is approaching the day when it will become a prized exhibit **WORDS: BEN DUNNELL**

It's one of the hottest days of this record-breaking summer, the sun blazing down on the parched Hertfordshire countryside, yet in a former farm shed one of Britain's longer-running restoration projects continues to take shape. Undeterred by this manifestation of the elements, just as they are when the winters get cold and the building's draughts become a weakness rather than a strength, members of the group working on the de Havilland Aircraft Museum's DH89A Dragon Rapide are here for their regular Wednesday session, plugging one of the few major gaps in this outstanding collection.

Predicting the end-date of any such effort is, of course, a fool's errand. So it has been with the Rapide. Previously intended as a return to airworthiness, the decision was taken earlier this year to make the twin a static exhibit. This means it will be seen through to completion at the DHAM's Salisbury Hall site, without the need to move elsewhere. And it will represent the type there as a permanent museum-piece, rather than being remotely based.

Had things progressed as planned on the machine's acquisition, it would have been flying long ago. Originally built for the RAF as a Dominie with serial NR833, it was a product of Brush Coachworks at Loughborough, being taken on charge in June 1945. However, conversion into a civilian Rapide was not long in coming. A certificate of airworthiness was issued in October, and it became YI-ABD with Iraqi Airways, delivered to that operator in February 1946. A switch to the British register as G-AKDW occurred in August 1947, the DH89A having been acquired by British European Airways, though it was to be operated by Gibraltar Airways. Again this assignment proved fairly brief, the Rapide entering storage at Ringway the following April and staying there until June 1949, when it was sold to Short Brothers. Operating out of Rochester, 'DW' functioned primarily as a company communications tool.

A short-lived May 1958 sale to Avionics Ltd of Croydon



Stages in this Rapide's life: clockwise from top left, in service with Shorts as a communications aeroplane, at Croydon with Avionics Ltd, and after its partial restoration for the Schiphol-based Aviodome museum. VIA KEN PYE

presaged the Rapide heading back overseas. Initially it went to Belgium, being delivered in June, but no re-registration took place. In fact it ended up in France with Société Aéro-Sud, becoming F-BCDB that November and taking up residence in Bône, Algeria. During its time in the North African country, the aeroplane was transferred for a period to Société Générale d'Affrètements

scheme with the name *City of Winchester*.

This is where the current story begins. Guy Black bought the Rapide in early 1993, and traded it to the Mosquito Aircraft Museum, as the DHAM was then known, in exchange for a Royal Aircraft Factory BE2 project. Restored to the UK register as G-AKDW, it was thought to nearly be ready to fly, and work started on the still uncovered

“Everything you could imagine being wrong with it was wrong”

Aériens, otherwise known as Air Fret, in Algiers. But the DH89A's operational era was coming to a close, and 'DB' was ferried to metropolitan France in May 1963, first to Avignon and then Nîmes-Garons, where it was stored for many years. The airframe was moved out during 1978, and Jean Salis purchased it in 1983. Taken on charge by the Aviodome, the Dutch national aviation museum, a restoration was carried out at its Amsterdam Schiphol premises, the result emerging in a fictitious colour

wings. Then the fabric was removed from the fuselage. In the words of museum volunteer Ken Pye, a former de Havilland apprentice who made his first ever flight in a Rapide from the Butlin's holiday camp in Skegness and enjoyed a long career in the design department at Hatfield, "It was a disaster."

His colleague Terry Pankhurst, another apprentice 'old boy' who now leads the Rapide team, elaborates: "The joints along the floor were rotten, there were cracked floor beams.

Everything you could imagine being wrong with it was wrong with it." Ken Pye adds, "The floor was damaged by battery acid spillage". Any ideas of an early maiden flight were thrown out of the window, and the volunteers set about a very long haul.

When last this magazine covered the Rapide rebuild in depth, back in 1999, the late John Maynard said as much. "Even a simple inspection", he reported, "without removing fabric or a single engine component, revealed deeply worrying deterioration or lash-up repairs". Compared with the situation as he found it, the past 23 years have wrought a definite but gradual transformation. Much hasn't changed, though. While only three of the team members featured then are still around, those involved today still need to show exactly the same degree of commitment and expertise. Most of the 10 currently engaged are free for the weekly Wednesday working day, while a few come in on other days as well, notably to tackle the fabric.

Their quarters have improved somewhat, too. The Rapide used to only occupy half of the building in which it sits; the other half was occupied by



to great lengths to maintain the width correctly and the spar positions, so we think we've put it together without distorting anything."

"The floor", says Ken, "is two parts: an outer ply skin with spruce cross-beams and an inner spruce 5/8in planking. Terry went to Lavenham, Suffolk, to cut these planks from the baulk spruce to save money — I went to help — and he then produced the double planks in the workshop. All the cross-beams were replaced as they are glued to the outer ply, but we were able to rescue the lengthwise stringers and some minor under-floor parts. Putting all this together, lying on our backs on a sloping ex-cow shed floor, was very difficult.



"The total replacement of the roof was easier, but manufacturing the circular escape hatch was tricky. Thank goodness there is only one! Replacing the left-hand upper longeron was difficult to do — we used a plastic drainpipe as a steam chest for the lengthy longeron. The spruce longeron was quickly clamped into position; the drainpipe had also softened considerably too!"

Some time back, when a restoration to flight was still the intention, the whole structure was X-rayed — the structure containing quite a bit of metal tubing — and the wood ultrasonically tested. More recently, the wall thicknesses were measured using some very expensive equipment provided on loan by Olympus, whereupon it was discovered that they weren't in accordance with the original drawings, many of which have formed part of the generous assistance furnished by Mark Miller of de Havilland Support. A full stress evaluation was conducted with no problems being found. The wing spar was repaired many years ago, but can still be seen to contain a bullet hole caused while the machine was flying in Iraq.

Much help has come from old friends and colleagues in the aerospace industry, all of it very kindly given for free. Both British Airways and, more recently, Appius+ at Luton have performed



TOP: Volunteers Ken Pye (left) and Terry Pankhurst inspect a portion of the starboard rear cowling. KEY/BEN DUNNELL

ABOVE: It was necessary to make the upper fuselage decking from new wood. KEY/BEN DUNNELL

ABOVE RIGHT: The piece of wood visible in the second window back is possibly unique on any surviving DH89A; it's a remnant of the bulkhead on the Dominie, as this airframe was built, which had a wireless operator sitting in front and trainees behind. The bulkhead was removed when the aircraft was converted to civil Rapide configuration, but the end of it and its associated roof member were left behind. KEY/BEN DUNNELL

a Mosquito wing. Having the full space is a boon. And when the time arrives to reattach the wings, the dedicated wing hoists recently donated by the Science and Industry Museum in Manchester will be very handy indeed. These became available once the loaned Rapide it had on display, The Aeroplane Collection's G-ADAH,

was installed in the museum at Hooton Park.

What, then, of the main challenges with G-AKDW? "It's probably easiest to say what isn't new", remarks Ken Pye. A large quantity of new wood has been incorporated, including the top skin, fuselage underside and bulkheads. It's a good thing that Terry Pankhurst is

an expert in aircraft woodworking. The biggest difficulty in his view was, "Putting the new floor in. Because our labour is free, we had to do it. It took us three years. We took 6ft out of the floor and put a 4ft panel back; then we took out another 4ft and put another 4ft panel back. All the time we had a 2ft gap, so we didn't lose our reference points. We went

The wings are being fabric-covered, with Ceconite, in the museum's Amy Johnson Hangar. One of the references in the foreground is *Aeroplane's* Database feature on the Dragon Rapide, published in our April 2004 issue. KEY/BEN DUNNELL



X-ray work. Another instance came during the height of the COVID-19 pandemic, thanks to a Stansted-based company that services instruments. “We took our instruments along not to be serviced”, says Terry, “but for an assessment of what we would need to buy new or look at in the future. Because they

had no work, they serviced them all, with certificates and everything, all for nothing, just to keep themselves ticking over.”

A great effort by the electrical specialists has seen G-AKDW be totally rewired to meet current requirements. Two DH Gipsy Queen engines were zero-timed by Vintech at Little Gransden — a job in which three of the museum's volunteers took part — but since the aircraft is no longer going to fly, these are now held as assets for potential sale. A further pair of Gipsy

Queens are in the process of being sourced for static display purposes. The engine cowlings, a long-running sticking-point, are nearing the finish line. “Although we got a set of cowlings with the aircraft”, Terry recounts, “they were not a matched set. Nothing fitted anything else. Two guys have worked now for more than

a year on making them fit together. We've had to put patches in, we've shortened things, we've lengthened things. They're doing the last two

cowlings now, and I think they're pretty much complete.”

Over in the Amy Johnson Hangar, fabric work on the wings is well-advanced. They are being covered in Ceconite, since it's both significantly cheaper and longer-lasting than the original linen. All four are at different stages, but one is virtually ready, and the last in the queue has

had its fabric stretched on with an iron, ready for rib stringing. The limiting factor here is the weather, with its implications in terms of moisture content, but completion in September or October is viewed as realistic on the most recent estimates.

No longer requiring G-AKDW to fly has taken a little of the pressure off. As for the reason behind that, Terry Pankhurst says, “We found an error in the paperwork going back some while. The CAA and the inspector found that, many years ago, we made new wing ribs, and that's not allowed. You're allowed to repair them, but not make them. We clearly made them, and stated as such. It would be such a problem getting over this that we decided it didn't ought to fly. We're not unhappy about this.”

Indeed, Ken Pye adds, “The team is quite happy that the aircraft is going to go in the hangar as a static display. They're pleased they're going to see it totally restored and assembled”. Had airworthiness remained the target, the Rapide would have

needed moving to a site where someone suitably licensed could assemble it, and which would have required an additional outlay at a time when the pandemic has hit museum funds. Nor had a future operating base and concept for the aeroplane been finalised. As it stands, some partition walls will have to be dismantled to get G-AKDW into the museum's new hangar, but that's reasonably small beer by comparison.

Ken would like the aircraft to be finished in its original production guise as a Dominie, but Terry prefers the idea of a civilian Rapide scheme, as the aircraft will have airline seats in. However it ends up, this very fine restoration could hardly represent a finer example of the sheer dedication required to see such projects through to completion — and how unforeseen circumstances can always intervene along the way. This, as much as any of G-AKDW's own history prior to entering preservation, will deserve recalling whenever the end product is viewed. **A**

SIDE HUSTLE

It looked the part, but the Side-Loading Tactical Airlifter version of the BAe 146 hardly saw customers beating a path to British Aerospace's door **WORDS: BEN DUNNELL**

A pair of camouflaged British Aerospace 146s being unloaded at a forward airstrip adjacent to a desert oasis, a military vehicle and an artillery piece emerging from the side loading door of one, troops pouring forth from the other. Behind them, Puma and other helicopters go about their business in this air-land operation. It's the stuff of artistic fantasy, of course. But the scene depicted on the brochure for BAe's dedicated military freighter version of its four-jet regional airliner was one the maker hoped to see replicated in the real world.

That period publicity material detailed how the 146 STA, the Side-Loading Tactical Airlifter, was intended to be more than just a mere transport. Yes, it could haul military freight, up to a 22,750lb payload in bulk or palletised form, and take up to 80 personnel in standard seating or 64 fully equipped infantry. It was able to carry out drops of paratroops and supplies, the 'T-tail' arrangement being touted as of particular value in allowing a clear exit trajectory. And for casualty evacuation, the cabin could be reconfigured to accommodate 18 stretcher cases and 26 seated wounded. But BAe also touted its suitability as a two-



Members of the Red Devils freefall team jump from the 146 STA to prove its suitability as a parachuting platform.

BAE SYSTEMS VIA DAVID DORMAN

point air-to-air refuelling tanker, a search and rescue support aircraft or a mobile command post. It saw the STA very much as a multi-mission platform.

And in all these roles, the 146's proven, existing capabilities were viewed as a boon. The value of its short take-off and landing performance was clear. Likewise, the rugged undercarriage with low-pressure tyres already permitted the use of unprepared strips. Perhaps

less obviously, the conventional flight control system and four-engine configuration ensured a good degree of redundancy and high safety margins in the event of sustaining battle damage, while the low noise level of the powerplants themselves, the Textron Lycoming ALF502 turboprops, was potentially a selling-point for clandestine operations. On the face of it, an attractive package. Why, then, did the STA lead nowhere?



The BAe 146 STA being displayed at Le Bourget for the 1989 Paris Salon, during which — in the hands of Peter Sedgwick and Vic Nightingale — it dropped a French parachute team. USAF



LEFT: Resembling a “badly painted Airfix kit”, the newly converted aeroplane arrives in the UK during August 1988. It didn’t look like this for long.

BAE SYSTEMS VIA RICHARD THOMASSON

“It wasn’t a new idea”, says Richard Thomasson, who in the mid-to-late 1980s was the 146 customer programmes manager in the project office at Hatfield. “In the original concept of the 146, there was always a military version, but nothing was ever done about it. The freighter programme had just started over at Hayes International, and the idea of seeing what we could do with a militarised 146 took hold... we thought maybe we could do something with aircraft two. It was one of the three prototypes, and, to be honest, nobody was too sure what to do with it. So, it was an ideal candidate airframe.”

“When Lockheed realised it was a threat, they pulled out of it”

That aircraft, originally flown in January 1982 as G-SSHH, had followed up its part in the 146 flight test effort with temporary assignments on lease from BAe to various carriers on both sides of the Atlantic. When the last of those, with American Airlines, concluded in February 1988, it became available for transformation into the first STA — of many, BAe hoped. This programme brought together two previous paper offerings, the 146

MSL (Military Side-Loader) and MT (Military Tanker). Now some actual hardware was to come into being.

In this, the existence of the freighter variant was a boon. Known as the 146 QT (Quiet Trader) and at this stage based on the -200 model, it had entered service with TNT during September 1987. Hayes International performed the conversions for BAe at a facility in Dothan, Alabama. But some

preliminary work had already been done using the first ever 146 prototype, G-SSSH. Former flight test engineer Roger de Mercado remembers how, in May 1986, it was flown “with

the rear port service door off, to check on airflow and turbulence inside the cabin. I was quite happy — well attached to the aeroplane, of course — to stand in the doorway at 1,500ft and admire the view.”

Keen to break into the American market with the military 146 as it had with the civil airliner, BAe found what seemed like a willing partner. “There was a deal signed with Lockheed”, says Richard Thomasson, “who helped the aircraft get assessed by the US Army and US

Navy. This was where it all backfired. Initially, Lockheed thought it would be a complementary aircraft to the Hercules and the Galaxy. Then they saw it would be quite a competitor to the ‘Herc’ in particular. A lot of the time, as the RAF has found out, you don’t need bulk for air freight; you need weight. Quite often the RAF’s ‘Hercs’ were not full when they were flying around, by any means. As soon as Lockheed realised it was a bit of a threat, they pulled out of it.”

But BAe’s team pressed ahead. In May 1988, recounts Thomasson, “The aircraft was sent to Hayes, and they put the freight door in.” ➤

BELOW: In formation with Hawk 200 demonstrator ZH200 during the late-1988 Far East and Australasia tour. In this and certain other BAe publicity shots from the time, the 146’s civil registration and manufacturer’s logos were deleted.

BAE SYSTEMS VIA DAVID DORMAN



PROJECTS BAe 146 STA

Freight door open, vehicles ready to load
— but how? BAE SYSTEMS VIA DAVID DORMAN



Short-field austere strip trials on the
grass at Hatfield. BAE SYSTEMS VIA DAVID DORMAN



By late 1990, the 146 STA had been
refinished in all-over olive drab and
configured as a pure freighter. The cargo
door, incidentally, measured 11ft wide by
6ft high. KEITH BLINCOW/AIRTEAMIMAGES.COM



They also painted the aeroplane in a US Air Force European theatre livery, but for some reason or another, which we never really understood, our marketing people wanted it painted gloss. This gloss-finished camouflaged aeroplane turned up at Hatfield in August, and two things happened in quick succession.

Everyone said it looked like a badly painted Airfix kit, and the other thing was that because the freight door was closer to the wing than on the -200 series, somebody ran the flaps down into it. It didn't get off to the best of starts. There wasn't too much damage, but it wasn't a good moment in a working day!"

No sooner had the newly converted 146 STA — re-registered as G-BSTA — arrived than it left again, bound for Cranfield where the left rear parachute door was added and the paint changed to matt by Cranfield Aerospace. The dummy air-to-air refuelling probe, meanwhile, was furnished by Marshalls of Cambridge — in part due to the company's expertise in the field through the RAF Hercules and Tristar tanker conversions, but also through a personal connection.

"We'd got involved with Marshalls because, in about 1987, aircraft were coming off the end of the production line at Hatfield and some of them didn't have any homes", says Thomasson. "Then, all of a sudden, we got the AirUK deal, and the only way we could get the aircraft finished was to put them up to Cambridge. My then boss Bernard Jones, who was an ex-Swordfish pilot, said, 'We're going to Marshalls, Richard. We're going to see Peter Hedderwick'. We drove up there and sat with Peter Hedderwick, and Bernard agreed with his old mate Peter that we'd put the first AirUK aircraft up there for conversion. On the way home I said to Bernard, 'Aren't we supposed to go to competitive tender or something?' 'Don't be silly, Richard', he told me. 'I know Peter, and Marshalls built Venoms for us, and their Venoms always flew straight'. That was it. The refuelling probe on the STA was actually wooden, and arguably it wasn't cleared for flight."



Thus equipped, the aeroplane made its public debut a few weeks later at the Farnborough show. Representatives of any prospective purchasers may have left less than impressed with the floor. "That was the Achilles heel, really", Thomasson comments. "The rear part of the fuselage, next to the freight door, was basically as per any freighter. There was a floor mat in there, and the Ancra [cargo handling] system. In the middle section it was kitted-out with longitudinal seats for parachutists to sit on, and at the front there was a VIP section so you could sit down and talk to people about the capabilities of the aircraft. That was how the STA was initially configured, which was great for sales and marketing, but it was a fairly useless aeroplane from a tactical point of view."

No-one could doubt BAE's commitment in trying to sell it. Almost straight after Farnborough, the 146 STA embarked on a more than 18,500-mile tour to South-east Asia, New Zealand and Australia. January-February 1989 brought a trip to the Middle East, and much of May was spent in North America. "It was a big, big effort, but unfortunately it didn't result in any sales. Everyone could see that the problem was the lack of a ramp. A firm called Britavia in Southend, which had some of the old boys from the design team that came up with the Aviation Traders Carvair, devised a ramp which could self-deploy out of the freight door. There was an excellent model of it, and it looked great, but — like all of these things — there was a penalty, in that it was quite heavy. A demonstrator ramp was made, but we never had one fitted and operating on the aeroplane."

“It was a fairly useless aeroplane from a tactical point of view”

In other ways, testing of the 146 STA went perfectly well. Air-to-air refuelling trials, for which G-BSTA — still with its wooden probe — flew close behind an RAF Victor, took place in October 1990. "As far as everyone was concerned, there was no problem", Thomasson recalls. "There was no great buffeting, and it could have progressed quite happily". Freefall drops were a regular occurrence, often providing a platform for the Parachute Regiment's Red Devils team at displays. "The only comment we all — half-jokingly and half-seriously — made was to make sure the airbrakes were shut. The parachuting went very well, but, of course, the sticking-point was always the fact that there was no rear ramp. The original concept for the 146, when it was just a 'paper' aircraft, was that there would have been a rear ramp. There are Hawker Siddeley drawings which show that."

Acting as an airshow para-jump aircraft hardly seemed a suitable return on BAE's investment. "It was just sitting there, and we'd come to the conclusion we couldn't sell it. One of the proposals was to scrap the aeroplane. I put a paper together to justify sending it back to Pemco" — as Hayes International was now named — "to get rid of

the forward parachute seats, get rid of the overhead lockers and turn it into a full freighter. The aircraft went back to Pemco, and was converted over the course of about three or four months. It became the one and only full -100 series freighter. When it returned to the UK, the Austrian Air Force deal started to develop, because now it was quite a practical aeroplane."

A demonstration visit by the 146 STA to Tulln-Langenlebarn air base in April 1990 piqued the Austrian government's interest. It was after a transport aircraft type for national use, both governmental and military. "We sent it up to Hunting at East Midlands", says Thomasson,

"because we'd been working with them as well, and they did the Austrian livery. There was quite a lot of work done on the role kit they wanted — a company called Aircraft Materials

in Newton Abbot, which makes all the role equipment for dropping Jeeps and that sort of thing out of the back of Hercules, got involved. But, unfortunately, it just didn't come off. The whole thing stalled. The aircraft was again without a home, and at that point in 1991-92 the BAE collapse was going on, with the move [of 146 production] up to Woodford.

"I moved across to running the commercial department at Hatfield, and then I got landed with all the used aircraft... The STA was one of them. Through some efforts in the early days of BAE Asset Management, it went off to Safair. After it had been there for maybe a

year it was replaced by [c/n] 2148, a -200 series freighter. Eventually in 1995 the aircraft ended up with Warren Seymour and National Jet Systems in Australia, where it finished its flying days."

That final assignment, as VH-NJV, proved the aircraft's versatility. "Warren's outfit used it for flying mining equipment up to places where nothing else could get in". It ended in 2018, and the airframe was broken up the following year, most traces of its unique past long-gone. But, as this 146 saw out its days, the concept of a military airlift version enjoyed a final flourish. The RAF had shown little to no interest in the STA, yet as its Hercules fleet displayed the effects of hard labours in Afghanistan, allied to fatigue life concerns with the older airframes, it turned to the BAE product as a means of filling its tactical airlift gap. Duly modified to meet RAF requirements, two ex-TNT 146-200 QC (Quick Change) models were taken on strength in early 2013. The 146 C3s, as they were called, spent much time in the Afghan theatre.

A few years earlier, with many other second-hand 146s on its books, BAE Systems had proposed a new military cargo variant, the 146M. One might say it hadn't learned a lesson from the STA, because it still lacked a rear ramp. This, Richard Thomasson feels, was what killed the original concept. "It took too long to load. As a freighter at commercial airports, the 146 works fine, because you've got the big scissor lifts and container-handlers. In the middle of nowhere, it was a bit of a problem. The rear ramp would have been a major redesign package, and given that BAE spent quite a lot of money on the freight door, I don't think it really had the appetite to do it."

A

BELOW: G-BSTA in Austrian Air Force colours at East Midlands in January 1991. Unfortunately, it was never delivered, the Austrians deciding not to proceed with the acquisition of a new transport.

CARL FORD/AIRTEAMIMAGES.COM

