

# The Restoration of ex-Mexicana de Havilland Comet 4C 6424 at the Museum of Flight, Seattle, WA

*A compilation by the de Havilland Aeronautical Technical School Association*

*Last updated December 2020 by Roger de Mercado*



**Robert B (Bob) Hood, without whom the project would not have taken off, died on 3rd April 2020 at the age of 87. His obituary is on page 35.**



[www.museumofflight.org](http://www.museumofflight.org)



## INTRODUCTION

The original objective of this compilation was provide regular updates on the progress of the restoration of the Comet formerly operated by Mexicana. Regular progress reports, many written specially for us by Project Manager Emeritus Robert B (Bob) Hood, appeared in the newsletters of the de Havilland Aeronautical Technical School Association. Modified versions of these reports are given here, also for continuity the 2006 posting on the Comet Team's website [www.dhcomet.com](http://www.dhcomet.com) (where there are also postings for 2004, 2007, 2010, 2011 & 2013; the website has not been updated since then).

In September 2012 a video was made by KBTC Public Television of the work of the team. It includes a short history of the Comet airliner. It can be viewed at <http://video.kbtc.org/video/2281445990/>

Brief histories of Mexicana and of the Comet, and an overview of the restoration, are on pages 2 to 7.

It is recognised that this article has become scrappy, but it would be a major effort to rewrite it!

## PROGRESS REPORTS

Between 2007 and 2012 Bob Hood provided us with the first of many updates on progress for inclusion in our newsletters. Later reports have been compiled from available sources. All these reports are archived in this document, with additional items and/or photographs for which there was no space in our newsletters.

Page 8	From DHAeTSA Newsletter Summer 2002.
Page 9	From Comet Team website 2006; from DHAeTSA Newsletter Spring 2007.
Page 10	From DHAeTSA Newsletter Autumn 2007.
Page 11	From DHAeTSA Newsletter Spring 2008.
Page 12	From DHAeTSA Newsletter Autumn 2008.
Pages 13-14	From DHAeTSA Newsletter Spring 2009, plus extra photos.
Pages 15-16	Team message from Jim Goodall; message to B/E Aerospace plus photos.
Page 17-18	From DHAeTSA Newsletter Spring 2010, plus extra photos.
Pages 19-23	Progress report for 2011.
Pages 24-25	From DHAeTSA Newsletter Summer 2012, also appreciation of fund-raising via Bob Wright.
Pages 26-29	Progress report for 2013, compiled using Bob Hood's weekly team reports.
Page 30	Progress report for 2014/2015.
Page 31	Retirement of Bob Hood; Comet in the news; death of Bob Wright.
Page 32	New Aviation Pavilion 2016.
Pages 32-34	Update April 2019.
Page 35	Obituary of Bob Hood, May 2020
Pages 36-38	Text of article in Everett Herald, July 2015

**MEXICANA**

**M**exicana Airlines was founded in 1921 under the name Compañía Mexicana de Transportación Aérea (CMTA). It claims to be the airline with the fourth longest tradition in the world. Mexicana became the first international airline to unite two foreign destinations: Brownsville and Guatemala. The route made stopovers in Veracruz, Minatitlán, Ixtepec and Tapachula, and continued on to the city of Guatemala. There Mexicana linked up with Pan American routes, which at the time flew to Miami, Nicaragua and Panama. In addition to five Ford Trimotors, the airline also had eight Fairchild FC2, three Fokker F10s, one Keystone and two Stearmans, which were mainly used for mail transfer and pilot training. During the 1930s services began to the capital cities of El Salvador, Costa Rica and Cuba, as well as to Los Angeles where Mexicana was the first foreign airline to touch down.

In 1959 five de Havilland Comet 4C airliners were ordered, although in the end delivery was taken of only three. On July 4th 1960, with one of the Comets, Mexicana commenced services between Mexico City and Los Angeles.

The article below was originally printed in the November 1959 issue of 'Enterprise,' the in-house de Havilland publication. It was transcribed for the 2006 edition of 'Comet Restoration News' by Ray Yeoman, a former student of DHAeTS, 1953 to 1958.

### **Comets Ordered by Mexican Airline**

#### **Early delivery of Three Comet 4C's**

**Ideally Suited for routes linking Mexico City with Los Angeles, Chicago and Havana.**

**Other Sales Negotiations Proceeding.**

The following statement was made on October 30 by the Compañía Mexicana de Aviación, the Mexican affiliate of Pan American World Airways:

Mexicana Airines (CMA) have contracted to purchase three de Havilland Comet 4C airliners at a total cost of 14 Million dollars, including spares and ramp equipment.

Mexicana expect to acquire the first two aircraft in December of this year and the third in mid-1960. They will be placed on the company's Gold Aztec international services, according to H. Max Healy, General Manager of Compañía Mexicana de Aviación.

From Mexico City flying time will be 3 hours 15 minutes to Los Angeles (1,580 st. m.), 3 hours 50 minutes to Chicago (1,800 st. m.) and 2 hours 30 minutes to Havana (1,103 st. m.). Mexicana are the first airline to purchase the quadruple-jet Comet 4C.

The aircraft, which has a take-off capability and rate of climb enabling it to comply easily with stringent anti-noise regulations, is particularly well suited because of its performance into and out of Mexico City, Mr. Healy said. The combination of 7,350 foot altitude, temperature and runway length in the Mexican capital places certain restrictions on jet operation. Tests of the Comet 4C, which is specifically designed to use the runways of almost all major airports, showed it was best qualified from Mexicana's standpoint. In one of these tests, a Comet 4 fully loaded for a flight of 2,680 statute miles to Lima easily operated from the 8,000-foot runway then in use in hot weather and zero wind.

After exhaustive surveys of all types of jet and propeller aircraft Mexicana selected the Comet. Adaptability of the airliner to Mexicana's volume of traffic was a factor in its selection. The Comet will carry 22 first-class and 64 tourist-class passengers, a configuration which will allow greater flight frequency than with larger aircraft. Surveys have indicated that on Mexicana's routes with Mexicana's traffic potential an 86 seater would ensure a more profitable operation than would a larger jet. Early delivery was another important factor in the choice made. In addition, the Comet 4C incorporates advantages of both the basic Intercontinental Comet 4 and the Continental Comet 4B, since the newest model has a longer fuselage than the former and greater range than the latter.

The power plant of Mexicana's Comets will be the Avon R.A.29 turbojet, one of the family of Rolls-Royce engines that propel 54 per cent of all gas-turbine transports in service or on order for civil carriers of the western world. The Avon engine, with a thrust rating of 10,500 lb., provides high reliability and low fuel consumption. Rolls-Royce probably are most familiar to Americans through their automobiles, which have long been synonymous with luxury, dependability and prestige.

An affiliate of Pan American Airways, Mexicana recently observed their 35<sup>th</sup> anniversary. In addition to their international services, the airline links 26 cities within Mexico.

## THE de HAVILLAND COMET 4C

The Comet 4C was the largest variant of the type. It combined the increased length of the 4B, which had a reduced wingspan, with the original wing of the 4. It was ordered by a number of airlines and by the RAF. Thirty were built; the last two were unsold and were converted into Nimrod development aircraft. Mexicana's three aircraft were 6424 XA-NAR delivered in June 1960, 6425 XA-NAS delivered in January 1960 and 6443 XA-NAT delivered in November 1960. The first two were converted from unsold 4Bs. The certification flight testing for the 4C was done on 6424, with completion to Mexicana standard afterwards, hence it was the second aircraft delivered. The cabin had 22 first class and 59 tourist seats, and this layout is being preserved in the restored aeroplane.

## MEXICANA CREW TRAINING

Les Hall went to Mexico five times as part of his job in the Comet Performance group in the de Havilland Aerodynamics Department in Hatfield. He relates:

“There are about 30 senior pilots in this picture, which shows us all in front of XA-NAS, the second aircraft. I'm the very young guy in the back row, third from the left. In the middle of that back row is their earlier Training Captain Ed Pineda. On his immediate left is the shorter Captain Huerta Jones, Director of Flight Operations. I can't remember any of the other pilots' names, but they were all Captains or Senior Co-Pilots. Pat Fillingham was one of the two training test pilots who went to Mexico and who took all of the CMA pilots through the flying conversion process immediately following my four one-week Handling and Performance courses.”



## COMET 4C 6424 XA-NAR

Pat Fillingham flew the first Comet 4C, constructor's no. 6424, registration G-AOVU, on October 31st 1959 after its conversion from a Comet 4B. After about 87 hours of certification flights, it was refurbished and delivered to Mexicana registered as XA-NAR. It inaugurated the 'Golden Aztec' service between Mexico City and Los Angeles on July 4th, 1960.

XA-NAR served Mexicana routes from 1960 to 1970. From 1970 to 1972, it was kept in reserve for the occasional charter. In 1972, it was sold to Westernair of Albuquerque, New Mexico, who re-registered it as N888WA. It remained at Mexico City for the following two years, undergoing a complete upgrade, which included a new paint job and a reupholstered interior.

Westernair planned to sell it and its sister ship to a large corporation in Europe. Ironically, the purchase negotiations took place in Geneva, Switzerland at the same time OPEC was having its organizing meetings across town. The OPEC meeting agreements triggered the Arab oil crises of 1974, which led to a five-fold increase in the price of jet fuel. The rest, as they say, is history: the value of many smaller jets, including the



relatively thirsty Comets, was slashed and the sale fell apart. The refurbished Comets were left at Mexico City until another buyer could be found.

A subscription-club airline in Redmond, Washington, Redmond Air, bought the Comet in 1978 and had it ferried to Salt Lake City to upgrade its electronics to current US standards. After a year; in July 1979, N888WA was ferried to Everett, Washington. It had accumulated a total of 27,065 hours of flight time.

It was grounded by the FAA at Paine Field with the insistence that all of the maintenance done in the 18 years since leaving the de Havilland factory would have to be re-inspected and signed off. Alternatively, it could be ferried to Dan Air at Lasham in the UK, to be re-certified to like-new standards. Since meeting either of these requirements would cost many times the value of the ship, it was left essentially derelict at Paine Field.

In 1984, title was transferred to the Everett Community College's Aviation Maintenance Technician School. Its exterior, which by that time was in very poor condition, was painted in BOAC livery by Boeing paint shop volunteers.

Unfortunately, nothing was done to protect the interior, and the aircraft was left outside with standing water in the hull for the following years. The climate in Everett has high background moisture and a slight salt content from the adjacent Puget Sound. Sadly, the only attention this historic aircraft received was from Paine Field Firefighters, who occasionally practiced their techniques by blowing high-pressure water through the engines and into the cabin emergency exits.

The Seattle Museum of Flight was given title to the Comet in 1994, and it was towed to the Museum's Restoration Centre at Paine Field/Snohomish County Airport in Everett, Washington in 1995. (For information about the Restoration Centre, see [www.museumofflight.org/Explore-The-Museum/Aircraft-Restoration](http://www.museumofflight.org/Explore-The-Museum/Aircraft-Restoration))

#### **DONATION OF AIRCRAFT TO MUSEUM OF FLIGHT**

The Seattle Times of 9th December 1993 had a report "Jetting into the Sunset" - 'Granddaddy' of jetliners saved from scrapheap. See page 6.

#### **MEXICANA AND PAN-AMERICAN**

The following was written in March 2015 by Bob Hood as an introduction for new volunteers.

Here is a bit of history about the Museum of Flight's DH Comet Mk4C Restoration Project, which has been underway since December 1995: de Havilland Comets were the world's first jet airliners, a distinction earned when they entered service full six years before the Boeing 707.

During its many years of restoration, our nearly derelict aircraft - the first Mk4C - has gone from a terribly corroded (near scrap) condition to its present status, with the cockpit and passenger spaces presenting a 'like new' appearance so that Museum of Flight visitors will ultimately see the same aircraft that passengers in "the World's First Jet Airliner" saw when it entered service in 1960. The skilled labours of about 250 volunteers over the years do show prodigious progress.

After delivery, the aircraft flew ten years for the Mexican flag carrier, 'Mexicana'. At that time, Mexicana was a closely-held affiliate of Pan American World Airways; and our Comet's livery was an exact copy of Pan Am's - but with 'Mexicana' emblazoned over the passenger windows rather than 'Pan American World Airways'. Sponsored by Juan Trippe, CEO of Pan Am, our aircraft (then G-AOVU and de Havilland c/n 6424), was certified for US domestic airline service by the FAA before being flown to Mexico City and re-registration as XA-NAR. Clearly, Mexicana's three Comet MK 4Cs could be easily converted to Pan Am's North American service by merely changing the registration numbers and the script over the passenger windows in the event that Pan Am's own - then new - Boeing 707s were ever grounded for some future technical problem.

Given the excellent reliability of the new Boeing 707s, this never happened, but Mexicana's Comets were a canny and revealing backstop to Trippe's long-term conservative domestic jet airliner plans.

Many of the aircraft's features, such as the thrust reversers - which later became standard in almost all jet airliners - appeared for the first time in the Comet. We are in the midst of making one of the Comet's pioneering thrust reversers a separate display item, which can be operated by pneumatic control valve to demonstrate the in-flight clamshell door's transition from 'in-flight' to the thrust reverse thrust position by display viewers.

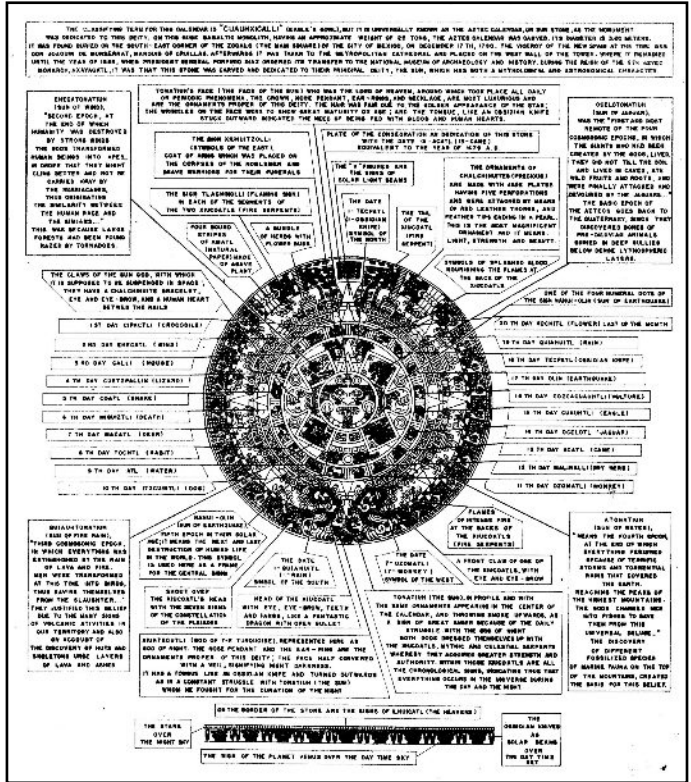
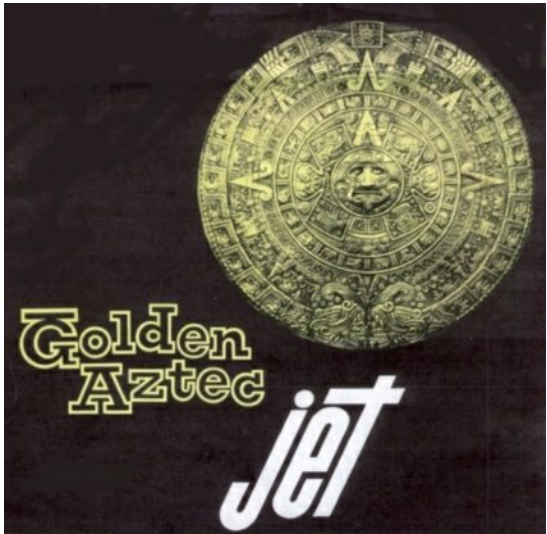
There is still room for volunteer creativity and design to enhance museum exhibit visitor's understanding of the great strides in air transportation created by the vision of a small group of about 100 designers at de Havilland in the mid 20th century.

**THE FIN EMBLEM**

The emblem on the fin of the Mexicana Comets was probably one of the most complex ever. It was a detailed representation of the Aztec 'Calendar Stone'. The Aztec Cuauhxicalli Eagle Bowl (calendar stone or sun stone) is said to have been carved in 1479. It is a massive basalt carving, 3 feet thick, almost 12 feet across, and weighing almost 22.5 tonnes. It was lost, buried under the central square of Mexico City, for over 300 years. In 1790 renovations began on the central square (Zocalo) of Mexico City. The carving was unearthed, renewing interest in Mexico's ancient cultures. It was put on display in the Western Tower of the Metropolitan Cathedral, and then in 1885 it was moved to the Museo Nacional de Antropología in Mexico.

A detailed diagrammatic explanation was in circulation at Hatfield at the time of the deliveries to Mexicana. The image at right (totally illegible here!) is of a poor photocopy.

Mexicana marketed their Comet services as Golden Aztec and the emblem featured in all their advertisements, of which some are shown below.



**Golden Aztec**  
GLAMOROUS AS MEXICO CITY

*new jet routes to mexico - fastest ever*

Now JET-TO-JET from Seattle, Portland, San Francisco, bounding the golden Aztec Comet in Los Angeles. Only on MEXICANA this newest Jet pattern! Extra speed, extra convenience... the joy of airtime, smooth-as-silk, based on B-707 Jetliner Jetliner flights. Ten golden Aztec departures weekly from Los Angeles (7:30 pm, daily, also 8:45 a.m.)... only 3 1/2 hours to Mexico City!

Who's the Jet Pilot for you? Call your TRAVEL AGENT OR

**MEXICANA AIRLINES**  
PAN AMERICAN affiliate

LOS ANGELES Five Van Ness Sixth St. Bldg. - RA 8-2821 - SAN FRANCISCO 219 Post Street - RA 7-3238

1958

Fly nonstop to MEXICO city

From  
LOS ANGELES 3:15 hours  
CHICAGO 3:50 hours

**jet**  
COMET 4C

fastest to mexico

Now... On the world's best equipped jet airliner... smooth as silk vibrationless flying to Mexico City plus the superb Golden Aztec Service... Refreshing treats, appetite teasers and your favorite cocktails are served aloft as a preview of the magic dinner to follow, along with delicious still wines and sparkling French Champagne... all with MEXICANA's compliments of course. Welcome aboard!

**Golden Aztec**  
service

**MEXICANA AIRLINES**



# Jetting into the sunset

## 'Granddaddy' of jetliners saved from scrapheap

BY INGRID RICKS  
Special to The Seattle Times

It has been grounded on the tarmac at Paine Field the past 15 years, a remnant of the early days of commercial jet airliners. Now, the plane that made history as one of the world's first commercial passenger jets will gain a new role — as the newest center of attraction at Seattle's Museum of Flight.

The British-made DeHavilland Comet, believed to be the only remaining one of its kind in the Western Hemisphere, was donated last month to the museum by the Everett Community College Foundation. The gift was in response, at least in part, to news that the plane's sister ship had been broken down for scrap.

Bill Loomis, an aviation instructor at Everett Community College, said the other Comet, which was being housed at Chicago's O'Hare International Airport, had been earmarked for the Smithsonian Institution and was in the process of being dismantled when something went wrong and the plane instead ended up as scrap metal.

The college, which acquired the jet in 1984 to use as a training tool in its Aviation Maintenance Technician School, had always intended to one day turn the historical aircraft over to the Seattle museum. But when news of the sister ship's mishap got out, Loomis said the school decided now was the time to act.

"We wanted to make sure to get it into the museum's hands," explained Loomis. "It's not just that it is the only one left of its kind in the Americas. It's the historical significance. This is the granddaddy of all jet airplanes. This is the one that started it all."

### DeHavilland built in 1949

The world's first practical jet-powered commercial transport airliner was put out by DeHavilland in 1949, about five years before The Boeing Co. introduced its first commercial passenger jet, the 707. The first nine Comet One airplanes were sold to British Overseas Airways Corporation (BOAC) right off the production line for use on the "empire routes" from London to Johannesburg, South Africa, and later to Calcutta, India.

"It's one of the milestones of aviation," Jack Hilliard, senior curator for the Museum of Flight, said of the plane. "It is representative of the first jet airliner that changed the face of society and made communication so much further advanced."

The Comet proceeded to set flight records and became the first jet to cross the Atlantic non-stop. But structural problems in the jets led to a series of accidents that caused DeHavilland to temporarily cut production. The flaws were eventually worked out and production resumed, but Boeing and McDonnell-Douglas had come on the scene, making recovery for DeHavilland so difficult that the Comet ended up on the endangered species list.

"Boeing at that point had well caught up with bigger aircraft at greater speeds," said Loomis.

The Comet 4-C, which has been a symbol of Everett Community College's aviation program the past decade, was in the last aircraft series to be put out by DeHavilland. It was similar in performance and seating capacity to the Boeing 727 and was used by a Mexican airline through 1970, when it was sold to Western Air.

Western Air later turned around and sold the aircraft to Redmond Air, which intended to use the plane for an air travel club it was operating. The business venture didn't pan out and the plane was eventually put up for sale.

But years of sitting unused on the Paine Field tarmac had taken a toll on the Comet. Corrosion had set in, its paint was peeling and potential buyers were hard to find. Loomis eventually convinced Redmond Air to donate the plane to the college to be used as a training tool.

As part of the donation agreement, the college promised to do what it could to restore the aircraft and succeeded in getting it painted in the original BOAC colors with the help of a California company which donated the paint and Boeing, which offered to paint the jet. It was a significant offer considering that Boeing was once an arch-rival to DeHavilland in the race for the first commercial jet.

### Landmark at Paine Field

The Comet has become a landmark of sorts at Paine Field and a source of pride to the aviation technician program, which features the Comet on its brochures and letterhead. But in truth, the old jet has yielded very little training value for the school. This is partly due to the aircraft's age and obsolescence.

But Aviation Instructor Pat Murphy said the main problem came down to mechanics. The school simply didn't have the correct tools to work on the aircraft. Rather than being sized to the American or metric system, the Comet's engine parts are based on the British measuring standard, the Whitworth system. "We don't have the right tools or the right bolt sizes, and I wouldn't know where to get them," said Murphy. "They're all Whitworth-sized. If we were in England, we'd do fine."

The Comet's lack of training value didn't stop students from falling in love with the aircraft. A few years ago, one student was so taken with the old jet he named it "Olivia," after the actress Olivia DeHavilland.

Aviation instructors at the college have also developed an attachment to the Comet. The fondness is more than apparent when Loomis takes visitors out to look at the old plane and begins to describe its features.

"Look at that engine," says Loomis, pointing out how the engines are gracefully embedded within the plane's wings, unlike most planes which have their engines mounted externally. "It's just like Flash Gordon. It's a graceful aircraft even though it's old."

Hilliard said the plane will be stored, at least temporarily, at the museum's Paine Field facility only 100 yards from where the Comet now sits. Eventually, the museum wants to move the historical aircraft down to its Boeing Field facility where it can be displayed with the rest of the museum's collection. Hilliard says it will take some careful study to determine how much restoration work is necessary on the plane and what will be the best way to transport it to Boeing Field.

Loomis' one regret is that he and his students weren't able to get the Comet in flying condition. Financially, such a feat wouldn't have been plausible for the school.

But Loomis makes it a point never to say never and he may yet get his wish. It may be the cheapest way to move the plane to Boeing Field.



## RESTORATION OVERVIEW

Restoration began at the end of 1995. The team found an aeroplane that had been derelict for 17 years, closed up with standing water in the hull and with very advanced corrosion everywhere. The air inside was so foul that they could only stay in it for ten minutes before they had to leave to get a breath of fresh air. Everything was covered with a heavy slime film. This presented a formidable challenge, since they were planning to bring this large aircraft back to museum static display standards.

All seats and upholstery were removed. All floorboards were taken up; almost all of the floorboards and seat rails had such advanced corrosion that they had to be replaced. All of the forward and aft cargo bay liners were removed to gain access to the inner skin and supports. The interior of the aft passenger cabin was stripped out, including two galley bulkheads, two toilet bulkheads and floor support framing. All six emergency exits, which are large magnesium castings, were removed, corrosion treated, and rebuilt.

The team's work has benefited from the generous encouragement of many individuals in the UK. Philip Birtles of the de Havilland Aircraft Museum Trust Ltd. and Nick Newton of the Ministry of Defence at Boscombe Down, plus many of their associates, have given the project vital support. Mexicana Comet Information has been supplied by Capt. Jorge Garcia Bencomo, whose father flew XA-NAS for many hours. Many aircraft suppliers have contributed materials and information. Further, access to British Aerospace archives for accurate historical information on de Havilland and on the aircraft's construction and appearance was kindly given by Ron Hedges and Pamela Guess.

Two trips were made to England to get more parts and information. On the second trip, in the summer of 1997, XV814, (formerly 6407 G-APDF) was bought at auction in collaboration with scrap dealer, Mil-ver Metals of Coventry. XV814 had been a Nimrod development airframe, known colloquially as the 'Comrod', and was the last structurally sound Comet slated to be broken up. With the cooperation of MOD people at Boscombe Down, just about all of the parts needed were removed from this airframe – including two landing gear assemblies, floor support frame members, cockpit seats, cabin seat tracks, replacement toilet bulkheads, and many other items which were all crammed into a 20 foot container. At that point the team had not only North America's only remaining Comet, but also about 10 tons of ex-Mexicana and ex-RAF spares – which probably represented the world's largest remaining stock of Comet parts. More than 17,000 parts were inventoried and stored. The whole XV814 aft floor structure was installed in XA-NAR, so today's museum visitors who walk through the aft passenger compartment can honestly say they have been in two Comets!

The original plan was to shrink-wrap the nose of the aircraft and place the tail in the hangar to be able to work on its control, etc. surfaces. The idea was that because the wing trailing edge was at nearly right angles to the fuselage centreline, whereas the sweptback wing leading edge would leave more of the aircraft outside when the root of the wings was brought right up to the wall of the hangar. Thus, more of the aircraft could be inside the hangar if the entire airframe was backed into its protected space. Later, practical problems in getting an acceptable weather seal for all of the openings in the nose, including the first class passenger windows, the cockpit overhead emergency hatch with its sextant openings and the many windows looking forward, including the movable direct vision panes convinced the team to turn the Comet around and move the nose into the hangar. In the long run, this was a good decision because restoration of the cockpit and forward passenger compartments were much more accessible via the forward crew door. Its disadvantage was that more of the wing surfaces were left exposed to Puget Sound weather until much later when the shrink-wrap enclosure for the wings was erected in 2011.

Much careful and intensive repair work has been required, necessitating the removal of the control surfaces and the vertical and horizontal stabilisers. Wing and fuselage corrosion was repaired to "good as new" standard and the fuel tanks were cleaned out. All four engines were removed for cosmetic cleaning; there was very extensive corrosion damage to the magnesium inlet sections. The engines were positioned under the starboard wing for display, allowing sight both of the engines and of the bays. Most of the engine bay doors were so corroded that new ones had to be made. The engine fire extinguisher bottles were removed and sent for recycling, thus removing a potential hazard. The engine nameplates were removed and carefully cleaned up. An illustrated plaque is planned with the plates mounted over an outline of the Comet showing the engines' original position in the aircraft. The No. 1 engine bay is equipped with explanatory labels.

A major task was the restoration of the badly-corroded thrust reverser actuators to full and free movement. A working mock-up of a thrust reverser assembly was constructed, powered by air.

LED lighting was installed in the aft baggage bay so that it can be viewed clearly. New LED light elements in the flight engineer's worktable lamp have been installed and many other lighting improvements have been made. Much painstaking work has been done in the cabin, specifically in the galley and wardrobe areas.

In addition to work on the Comet itself, there was a logistics effort to locate, catalogue and store all the off-aircraft and spare parts. Workshop facilities were improved, as was the office accommodation.

### From the Summer 2002 Issue of the DHAeTSA Newsletter

In March 1992 the Museum of Flight held a major celebration for the “50th Anniversary of Jet Transportation” to commemorate the introduction of the Comet into scheduled passenger service with BOAC in May 1952. The event was planned around the presentation of the Pathfinder Award to John Cunningham.

The Pathfinder Award was initiated in 1982 by the Museum of Flight and the American Institute of Aeronautics and Astronautics. From the beginning, the goal was to honour pioneering achievements in flying, engineering, education, operations, and other fields – to name as Pathfinders those men and women whose efforts in the fields of aviation and aerospace impacted all of our lives in one way or another. Until now, it has been presented exclusively to citizens of the USA and has been rather naturally dominated over the years by famous names from Boeing, including the founder of the company. John Cunningham is the first and almost certainly the only non-US citizen to receive this prestigious award, which has been given to him in recognition of his pivotal role in the de Havilland team at Hatfield for the achievement of such a fundamental advance in aerospace. When the decision to make the presentation was announced late in 2001, plans were made for ‘J.C.’ and his sometime-Personal Assistant Philip Birtles to fly to Seattle for the event. Regrettably, a health problem made it inadvisable for him to make the journey: however, the Museum asked Philip to accept the award on John’s behalf. After making a brief video interview with John, Philip flew to Seattle to receive the award. This was presented at the ‘Comet Dinner’ held at the Museum on Saturday, 9th March. The Dinner programme contained the following brief tribute:

John Cunningham joined the de Havilland flight test team in 1938, a mere two years after his first solo. He retired from the same organization forty-two years later as its chief test pilot after a career of unparalleled distinction. In addition to pioneering night-time fighter tactics during World War II, Cunningham made the first flights in twenty-nine different aircraft types, including the Comet 1 jetliner in July of 1949. Cunningham is a Commander of the Order of the British Empire and a recipient of the Harmon Trophy.

The Celebration programme concluded on the Sunday with a visit to the Museum’s Flight Restoration Centre at Paine Field, Everett, where the ex-Mexicana Comet 4C is undergoing its major restoration. Several ex-Tech. School members attended the celebration, amongst them Roy Combley, Eric Crudden and Bob Peggs. Roy forwarded the following item from the Seattle Museum of Flight newsletter concerning the Comet restoration - it is most ‘heart-warming’ to hear of such dedication and continuing interest in The Comet in America!

#### The Power of One

Recently, the Museum commemorated the fiftieth anniversary of the initiation of commercial jet service by the de Havilland Comet. Our Seattle celebration preceded the actual anniversary date by two months; the official activities will be held in England in May. The event here occurred because of the incredible efforts and persistence of one man: Bob Hood, project manager of the Comet restoration.

Throughout the planning process for the event, there were many nay-sayers who insisted that interest in the Comet and in the invited speaker – test pilot John Cunningham – was minimal. Many doubted that an audience would gather to hear the history of the Comet first-hand from the man who test flew it and from those who came after him.

But they came! They came even after John Cunningham cancelled his appearance at the last minute due to health problems. They came to hear the panel discussion and to talk to the men involved with the development and testing of the Comet. They came to tour the aircraft in its gutted condition.

As the discussion unfolded in our theater, we were reminded of an inspirational era during which incredible technological advances were achieved, a time when major problems were solved in informal discussions around a drawing board. The Comet paved the way for the safe, efficient and affordable commercial airline travel we all enjoy today.

I had often wondered what keeps Bob Hood so committed to the Comet project. Surely, without his

leadership and personal support, the project would have stalled years ago. Most would have walked away, feeling totally overwhelmed by the massive extent of the project. During the open house, as we walked on wooden planks through the interior of the Comet and peered at the cement hangar floor through holes in the fuselage, I asked myself, “What keeps the volunteers coming? The project is so huge!”

But then I talked to Bob. Continuing the work is easy, he says. “You carve out one section at a time and mark your progress. The Comet was a remarkable aircraft in its day, and it deserves a position within the galleries of the Museum. It represents an incredible achievement in commercial aviation history.”

I have been receiving emails, phone calls and letters from people around the world who have recently learned of our restoration project and our effort to reunite John Cunningham with the Comet at a public forum in Seattle! The message has universally been one of resounding support for the Comet restoration. It is quite thrilling to “feel” people’s commitment and interest.

The efforts of one man, Bob Hood, will ultimately impact thousands of visitors as they experience the history of the Comet and the men and women who advanced the technology through dedication and personal sacrifice. We must honor the spirit of people like Bob Hood, who, in the face of incredible challenges, continually move forward, ensuring that history is remembered and shared.

**Elissa Lines**  
**Director of Membership & Development**



**Posted in 2006 on the Comet website at [www.dhcomet.com](http://www.dhcomet.com) which includes photos.**

### **From the Desk of Bob Hood & Jim Goodall ~ Comet Progress Update**

**R**egular readers of this report have seen the accelerating pace of completed work. We are pleased to report that this trend continued through the end of 2006.

We are particularly thankful for the gifts and support of many kind and generous people and organizations separate from the Paine Field restoration crew.

On the other side of the Atlantic, volunteer Bob Wright masterfully guided acquisition of a complete set of “timed out” Comet/Nimrod landing gear. Bob shepherded five pallets of gear through a virtual odyssey. The parts were trucked from RAF Kinloss to the Midlands, where they were prepared for air shipment, thence to London, where Sir Richard Branson’s Virgin Atlantic kindly transported them to San Francisco. From San Francisco, FedEx ground shipped them to Paine Field. Words could not adequately describe how grateful we are for all of the support from cooperative friends at the MOD, RAF Kinloss, and the many military and civilian people who made this possible.

Special thanks go out to the United Kingdom's Ministry of Defence, RAF Station Kinloss, BAe Systems, FRAviation Ltd., Virgin Atlantic Cargo and FEDEX. Within these organizations, key players in providing and transporting these, and other parts, were Sir Richard Branson, Warrant Officer Clive Buckland, Jim Carl, Dave Hebbbron, Rab Logan, Sean McCourt, Alex McMurray, Dave Squires and Dave Thorne. The Museum of Flight recently presented commemorative plaques to these people in appreciation of their help.

Our fall issue showed pictures of forward passenger cabin progress. Jim installed the carpets in this area – another great visual advance. Also, we received the first pair of reupholstered tourist section seats, and they look very good. We are able to upholster these seats thanks to the generosity of one of the former owners of our ship, Vera and LeRoy Olsen. LeRoy has continually supported our restoration – having already given us nearly 10 tons of ex-Mexicana Comet spares. We are truly grateful to the Olsens for their earlier contribution of cockpit seats re-upholstering, and now for the cost of upholstering 59 passenger seats!

We have begun to sew curtains for the forward compartment and center bulkhead airconditioning duct covers are being covered in vinyl.

Large (12 foot long) belly skin panels under the aft toilets were painstakingly removed to reveal some of the most advanced corrosion in the entire aircraft. The supporting frames that we could save were cleaned and bead blasted in preparation for paint.

Meanwhile, back in the hangar, we are working on the aft passenger cabin’s two parcel shelves. The first shelf is just about ready for paint, and we removed the second one from its nine-year hangar balcony storage. This adds to the list of assemblies that will be ready for the aft compartment, including many galley units, two toilets, etc. Final galley shelves and switch panel are nearly finished. Seat tracks over the center section will be replaced by tracks now under restoration.

### **Published in the Spring 2007 DHAeTSA Newsletter**

**S**tarting in December 1995 with an essentially derelict aircraft, greater than 150,000 volunteer hours have been spent restoring C/N6424. During much of the 11-year history of the project, our major investment has been in labor, disassembling and cleaning this massively corroded aircraft. This took time and hard effort, but not much in the way of materials and supplies. We were blessed with a large ex-Mexicana spares inventory, and through the cooperation of many English friends, including the MOD at Boscombe Down, were able to add parts from XV814 and many RAF Comet spares.

Now, we are installing assemblies painstakingly restored over the past eleven years. The pace quickens as each component contributes to completion of the eventual display. So far, much of the work in the forward part of the ship is done, with the cockpit, forward galley, forward toilet, and 80% of the forward passenger compartment finished.

While previous work has been manpower intensive, as we move forward a proportionate increase in parts and materials purchasing costs makes the remaining work more financially challenging. We have some tasks that require specialized business suppliers. For instance, we have just given a local shop the contract to upholster 59 tourist class seats, and the hunt is on to find 22 seats for the first class section (which will undoubtedly also need re-upholstering).

***Robert B. Hood***  
**Project Manager Emeritus**

**Published in the Seattle Museum of Flight newsletter and reproduced in the Autumn  
2007 DHAeTSA Newsletter**

**From the desk of Bob Hood and Jim Goodall – Comet progress Update**

In our last newsletter, we reported on the vigorous and accelerating progress of work. With the acquisition of new landing gear from the Nimrod program facilitated by our friends in England, we are proud to report that this pace has continued, culminating in a major project milestone.

The Comet now stands on its new main gear, which replaces the severely corroded and massively broken gear that had deteriorated due to 28 years of exposure to an atmosphere polluted by industry and traces of salt water from nearby Puget Sound. Just after restoration began in 1995, the trailing radius arm of the right main gear failed, separating the rear axle from the vertical strut. In 2001, temporary bracing was used so the aircraft nose could be towed into the hangar supported on the right by only two remaining main gear wheels. To support the weakened gear and to stabilize the airframe so that there was no risk of movement against the hangar opening, jacks were placed under the aft main spar jack points and the nose gear.

We were surprised some months later when the upper end of the right gear's vertical strut literally exploded – throwing fist-sized clumps of aluminium forging onto the parking area! Close examination of the failure showed progressive material failure, probably due to long-term stress corrosion. Further, a look at the other left main gear also showed cracks in a critical area, which convinced us it too would eventually fail. This set off a long-term search for replacement gear that succeeded (as mentioned in our last progress report) thanks to the support of our many British friends, including the Ministry of Defence and Virgin Atlantic. While we all knew that the Nimrod gear was designed to exactly fit into our much older Comet airframe, there was always a lingering fear that small changes made over years might make its fit in our aircraft problematic. To the relief of the entire team, the Nimrod gear fitted perfectly into the original mounting points. Our appreciation goes out to Bob Wright and all of our supporters across the pond who obtained the gear, and to Jim Goodall and Paine Field volunteers Bob Hood, Steve Belenky, Dale Chapman, Adrian Corson, Bruce Cronk, Allan Harwood, Russ Hoff, Frank King, Rebecca Lynch, Charley Price and Craig Wall who installed it.

With installation of the new landing gear, we now need to address the impact of the load on the tires. Due to the constant pressure placed on the tires by the aircraft's weight and the fact that they are over forty years old, they need frequent inflation. In order to preserve the appearance of fully-inflated tires, and minimize maintenance, we will use the Wright-Patterson National Museum of the United States Air Force process by filling the tires with high-density polyurethane foam. This will remove the requirement to replenish the air in the tires by permanently sealing them, to keep them display worthy for many years. Presently, we are looking for donations of money or services to complete this project.

Concurrently, attention has turned towards removing the four Rolls-Royce Avon turbojets, and applying corrosion treatment to the engine compartment. Once completed volunteers will restore the compartment to static display condition with the corroded engines later salvaged.

Aft of the wings, restoration of over 80% of the major components is complete. Work is currently under way reinstalling the lower belly skin after extensive corrosion repair and treatment of the panels and stringers. Once this task is complete, we will remove the Comet's horizontal and vertical stabilizers in preparation for placing the rear fuselage under cover inside the main restoration hangar where refurbishment will begin on the aft passenger cabin. Our thanks go to David McKee, Ross Michel, Craig Wall and Hank Pucket for assisting in the reskinning of the lower fuselage.

Forward of the wings, interior work is progressing into its final stages. Half of the cabin window curtains have been reinstalled; this is the first time since 1996 that any of the cabin windows have had curtains. Once the reupholstered seats are added, the forward tourist and first class cabin will appear as it did upon entering service with Mexicana.

Since April of 2002, the Comet forward fuselage has been under cover in the restoration hangar at Paine Field, leaving the section aft of the wings open to the elements. This fall, we plan to cocoon the forward fuselage in plastic to protect the restored interior and exterior components from deterioration and turn the aircraft around in order to complete work on the rear section of the aircraft.

As work progresses into the first class passenger cabin we need business class seats from the Avro RJ/BAe 146 series of airliners. These particular seats match the specifications of the original first class Mexican seats. If you know of any seats available please contact the Museum.

Overall, because of the dedication of our volunteers and donors, the momentum behind this project remains strong. Thanks go out to all for making 2007 a momentous year for the project.



**Written for the Spring 2008 DHAeTSA Newsletter by Bob Hood**

Now that the weather is improving, we are getting ready to remove the empennage surfaces in preparation for turning the aircraft around to put the aft fuselage into the hangar.

Last week, we purchased scaffolding and jacks to support the horizontal stabilizers while their mounting bolts are removed. It will be challenging, since these bolts have been exposed to the weather almost continuously since 1959.

Before the turnaround, we will completely wrap the forward fuselage in heavy 'shrink wrap' plastic. The wrap will protect the restored forward fuselage from the weather while the aft end is in the hangar. Further, a dehumidifier will keep the cockpit and forward fuselage dry, and should essentially stop further corrosion. The wrap will cost about \$2900, and we are currently trying to raise money for the effort.



*Steve Belanke and Mike King repairing elevator corrosion*



*Bill Bush removing an elevator, supervised from above by Mike King*

Of course, this turnaround would not have been possible without the surplus Nimrod landing gear contributed by RAF Kinloss, which we installed last year. (We had it thanks to the efforts of Bob Wright, and his friends at Kinloss. Particular gratitude is owed to Rab Logan of Flight Refuelling Aviation, who are contracted to carry out major Nimrod servicing at Kinloss, for his continuous support, sage advice, and critically needed used parts.)

Our restoration will return C/N6424 to its original seating configuration, with 59 tourist and 22 first class seats. All of the tourist seats have been restored, with the heavily corroded steel-framed seats we found at the beginning of restoration replaced by modified ones contributed by Alaska Airlines, upholstered with fabric specially loomed to match the original photos in dH archives at Farnborough. (As ours was the first Mk4C, dH made very good photographic records of its factory new appearance.)

For about 10 years the dilemma has been: "Where will we find 22 first class seats to match the appearance of the originals?" We have attempted for about a year to manufacture first class seats by cutting tourist seats in half and adding a patch in their backs and bottoms, but the results were very time consuming and ultimately unsatisfying.

Just last month we got great news! Thanks to the good efforts of Dubai Aerospace (an aircraft leasing firm), B/E Aerospace has promised to manufacture a complete set of 22 seats based on the RJ series pattern. They will be modified to match those shown in dH archive photos, using custom matching fabric loomed by AaBe Textiles back in 1997.

We are off to a good start. Our initial progress in 2008 is truly encouraging, with a large portion of it due to the kind and generous support of our friends in the UK, in particular from dHAeTSA members.

***Robert B Hood***  
**Project Manager Emeritus**

## Written for the Autumn 2008 DHAeTSA Newsletter by Bob Hood

We celebrate satisfying 'first Mk4C' Comet Restoration progress for 2008's first eight months.

### EXTERIOR PROGRESS

The great event this year took place 14th August with removal of the second (starboard) horizontal stabilizer. (The port stabilizer had been removed two days earlier.) For those not familiar with Comet construction, the magnitude of this event requires some explanation. The fore and aft main spars of these surfaces are joined by four large (1.5 inch diameter by 5 inch long) pins. Our restoration crew is prepared to swear (legally and pejoratively) that these pins were designed to never be removed. We spent about six weeks trying to get them out.

However, our good friend at RAF Kinloss, Rab Logan, reassured us that they are routinely removed during major Nimrod inspections. He gave us very detailed instructions. Their technique employs a combination of heat, very high torque, careful adjustment of the stabilizer weight load on the pins, hydraulic ram pressure, and a ten-pound slide hammer. We used Rab's advice and were pleased to find that these techniques did break loose three



*Jim Goodall with sledge hammer 'persuading' a pin to break loose while John Blum covers his ears.*

of the pins from their forty-nine year sojourn (they had not been removed since their 1959 Hatfield installation). However, the fourth and most-difficult-to-reach pin (in the upper forward location) was not as cooperative. At Rab's suggestion, we bored out this hardened steel pin to 0.75 inch diameter (a many hour task), heated it, then poured liquid LN2 into the cavity – hoping that thermal shrinkage would help. It did not. A few days later, we acquired a six point impact socket and enlisted Dave McKee, the Restoration Facility's strongest volunteer, to apply maximum force on the pin using a breaker bar with pipe extension. After carefully fitting himself into the small compartment behind the forward spar, we heard a groan, a grunt, and a "bang" like the firing of a small cannon. THE PIN HAD BROKEN LOOSE. Moral to this story: BRUTE FORCE artfully applied DOES WORK.

With this pin and its fellows air hammered out, Jim Goodall, the Comet crew, and volunteers from the rest of the facility, including Director Tom Cathcart, were able to remove the two stabilizers. They are now at ground level and available for restoration. Concurrently, we removed almost all flight control surfaces: elevators, flaps, ailerons, and speed brakes.

### INTERIOR PROGRESS

Meanwhile, there has been substantial progress in the aft passenger compartment. At the beginning of the year, this area was just about void of everything but structural frame members and the skin's inner surface. The only finished items in sight were the emergency exit doors, which had been restored in 2007.

We started by installing the over aisle light / speaker / annunciator bar – a completely new construction with 110 Volt AC lighting. Next, we installed the two long overhead air circulating ducts with their attached Coanda Effect airflow aiming panels.

A note on air handling: Whenever the Restoration Facility is open, blowers mounted in the forward baggage compartment continually feed the fore and aft overhead ducts. This evenly circulates the air, helps stabilize temperature, and keeps down any possibility of condensation. At all times, external dehumidified air from a Munters industrial unit is fed into the aft fuselage. With the structure closed up, an approximate relative humidity of nineteen percent is maintained.

Next, long strips over the windows were cut and installed along with retaining strips for the overhead laminate panels. This was followed by remanufactured laminated window surround strips, and the cutting and trial fitting of the first thin wood window level interior laminate support panels.

At the aft end of the compartment, work on riveting the compound curved underbelly skin panels was coming to completion, with hundreds of modern Hylock fasteners to 'pull in' the badly distorted sheet metal. Next, heavy floor panels were permanently installed. Restored shelf panels were carried into the aircraft and temporarily stored in the forward passenger compartment. After attaching the Wardrobe hangar bar assemblies, the aft toilet bulkheads were put in place, including the pre-restored sinks, mirrors and lights.

All things considered a period of excellent progress!

**Robert B Hood**  
Project Manager Emeritus



## Written for the Spring 2009 DHAeTSA Newsletter by Bob Hood

Jim Goodall and the Comet crew are celebrating a successful fall and winter season. Progress has been good right through Jim's recent departure for knee replacement surgery. Fortunately, he will be returning soon after several months of convalescence.

By the end of last summer, interior restoration forward of the center bulkhead – including the cockpit, galley units, toilet and passenger compartment – was essentially complete. All that is needed to finish restoration of this area is to add the 22 newly manufactured first class seats, which are given thanks to the generosity of Dubai Aerospace Capital and B/E Aerospace. Their delivery and installation in August 2009 will make the compartment ready for display.

This winter our interior work centered on the aft passenger compartment, including galley units, toilets, and wardrobe areas. The original plan was to turn the aircraft around so that the aft fuselage would be in the hangar for warm interior work while the completely restored forward end (including cockpit and forward passenger compartment) would be outside --- unheated, but 'shrink wrapped' in plastic to protect it from the weather. Unfortunately, we were not able to raise funds for the shrink-wrapping, so decided to keep our forward fuselage in the hangar and out of the weather.



*Russ Hoff preparing a parcel shelf.*

In preparation for the winter, exterior work included removing all tail surfaces, which were then moved

into the hangar for restoration and protection from the elements. The horizontal stabilizers are mounted on the wooden frames originally used to remove them from the aircraft. Inside the hangar work began by separating the horizontal stabilizer leading edges and removing much of the defrosting duct work. An accumulated mess left by generations of nesting birds was flushed out to begin the restoration process. The wing and fuselage surfaces to remain outside were cleaned as well as we could.



*Aft passenger compartment, March 2009.*

The winter's work concentrated in the often frigid aft fuselage ---we learned there how remarkably cold one can get working in an aluminum tube when the outside temperature hovers around 0 degrees C. We also learned that small

electric heaters are an inadequate counter to that tube's icy rate of heat loss. In spite of this, remarkable progress was made.

Assuming that our present pace continues (augmented by a recovering Jim Goodall back in his usual good form) we should complete the interior by mid – to – late summer 2009.

**Robert B Hood**  
Project Manager Emeritus

**Some completed areas:**



*Flight deck*



*Galley*



*Galley*



## Messages from Jim Goodall and Bob Hood, September 2009

*From Jim Goodall:*

To one and all:

Well it's been a ten year trek, not only for me, but for Bob Hood that started the process of trying to find out just how we could get first class seats for our Comet. Our search was helped by friends at de Havilland Employees Association; to BAE Systems; to Mexicana; and almost through desperation to looking into making them ourselves by modifying some Alaska Airline seats that we had extras of.

On Wednesday, 09/09/09 we received what I would call an early Christmas present, twenty two beautifully built replicas of the original de Havilland seats that were in our Comet on the date of delivery. In addition to Bob and so many other very special people that I can't begin to even start naming them, a few stand out: Dave Robichaux of Dubai Aerospace; Pete Morris, Ed Kinner and Mitchell Freeman all of B/E Aerospace; and the best crew of volunteers a project manager could ever ask for.....thanks to all involved!



*From Bob Hood to B/E Aerospace:*

### THANKS TO THE GENEROUS PEOPLE WHO DUPLICATED THE “FIRST JET AIRLINER” FIRST CLASS PASSENGER SEATS

This is written to recognize the support of the talented people at DUBAI AEROSPACE CAPITAL, B/E AEROSPACE, FRANKLIN PRODUCTS, AND TORRINGTON DISTRIBUTORS. Particularly, all of those whose inspiration, time and patience are deeply appreciated: Bob Genise, Dave Robichaux, Ed Kinner, Pete Morris, Mitchell Freeman, Nancy Beck, and their associates.

A short personal comment might give you some idea of the wonderful difference your new seats, which so faithfully duplicate the original ones, have made to our restoration project.

Restoration by its very nature is a long-term process marked by a seemingly endless series of incremental steps. Over the 14 years since the beginning of the project, about 350 volunteers have made many small steps forward – each one concentrated on an individual assembly – a cockpit instrument, or a piece of galley equipment, or the acquisition of fabrics and custom laminates to duplicate original materials.

When each step is done there is a satisfaction in that separate item's quality of restoration, but its relationship to the whole is often hard to see. Over the years, the “sense” of the entire reproduced aircraft appearance gradually emerges, until one final step causes the whole to come together. Then in a flash, the restorer sees with perfect clarity exactly what the original designers had in mind. It is as if the designer's ghosts stepped out of the shadows to say “There it is – that is what we intended”.

It is a moment of complete satisfaction and it justifies all of the investment in time and effort to that point.

We had just such a moment when your seats were installed in the aircraft. The surrounding colors, which combine metallic gold panels and fabrics with white and pale green / gold laminates, together with the dark blue carpet and bright aisle panels are just right; and suddenly we could see what the designers intended.

Your seats tie it all together and Mexicana's “Golden Aztec” interior is now returned to all of its original elegance.

Thank you for doing such a fine job, and for giving us that moment. But, more important, we thank you on behalf of future visitors to the Museum, who will see the last copy of the “world's first jet airliner” with an interior virtually identical to the one it had when it left the factory in Hatfield, England a half century ago.

The entire Comet Restoration Crew joins Jim Goodall and me with our sincere appreciation for your excellent accomplishment.



THIS IS WHAT WE STARTED WITH!



*Enjoy your flight, Marilyn!*



*Forward cabin overview,  
with the new seats in place.*

*Close-up of new seats.*





## Written for the Spring 2010 DHAeTSA Newsletter by Bob Hood

(Note: the photographs were not included in the Newsletter)

First, the good news – our steady progress has now reached the point that almost every added touch to the Comet interior brings us visibly closer to completion. Currently, after installation of new first class seats in the forward passenger cabin, our focus has been on the aft cabin.

One important improvement is less visible. In past years, winter work in the aft compartments has been almost impossible because that part of the aircraft is out in the weather. (After all, the thin aluminum tube of a parked aircraft's fuselage is a very efficient heat (cold!) transfer device.) Vain attempts to warm the interior with portable heaters produced blown circuit breakers and fire hazards, but very little warmth. Volunteers claimed that ice could form in a coffee mug on a cold night.

A local HVAC (Heating, Ventilation and Airconditioning) company and good friend of the Comet generously gave us a residential electric furnace along with custom duct fittings, wall thermostat, and many installation items. Further, an electrical contractor gave us the advice and hardware needed to connect it to electrical power. So, after running many feet of conduit, and many trips to electrical supply houses, we now have a furnace in the cargo bay under the aft passenger compartment that keeps everything at any temperature we desire. In cold weather, the aft passenger compartment may now be the warmest place in the Restoration Center.

So far, we have very closely recreated the appearance of our aircraft's forward half more than half a century ago when those 1959 Hatfield flights took place. The accuracy of reproduction was recently confirmed when we received a 1960 first class section photo from the Mexico City Mexicana museum. It shows an interior almost exactly like ours!

So far, we have very closely recreated the appearance of our aircraft's forward half more than half a century ago when those 1959 Hatfield flights took place. The accuracy of reproduction was recently confirmed when we received a 1960 first class section photo from the Mexico City Mexicana museum. It shows an interior almost exactly like ours!



*Aft cabin with trial carpet fitting, more window curtains in place. Note the grill in the center aisle floor.*



*Reinforcement at corner of emergency exit.*

The aft passenger cabin should also reproduce the original appearance. But, in this section, we are going to show visitors a few of the many very creative and technically impressive features of the de Havilland design. Features to be highlighted include the massive reinforcement around the emergency exit. Also, we plan to have a clear panel in the floor over the aileron control bay. Its many features will be spotlighted with explanatory placards drawing visitor's attention to the 'fly by hydraulics' controls and many levels of system redundancy. A small clear panel in the ceiling will also show the very advanced (for the 1940s) use of Coanda effect to direct air-flow from overhead ducts to the space between the outer skin insulation and the interior finish panels.

**For advice on further exhibit items, we are looking to readers of this article who were involved in the design and manufacture of Comets. There must be a number of creative features in this part of the ship that stand out in their memories. If you would like to see these features in the Seattle Museum of Flight exhibit, let me know and we will look into adding them.**

*Continued...*

One item of bad news: The Museum, like many non-profit organizations, has been hard hit by the economic downturn. As part of a long list of financial cutbacks, they were forced last November to lay off Project Manager Jim Goodall. Jim has done great work, and we are very sorry to see him go. On the bright side, he has just been hired as Associate Curator by the Pacific Aviation Museum on Ford Island, Pearl Harbor, Hawaii – an excellent professional promotion after his decade of work on the Comet.

Be assured volunteers are continuing the project and will complete the interior later this year. Also, as this is written, they are fitting a port underwing patch to repair corrosion damage.

**Robert B Hood**



*Center section under carpet floor heating "electric blanket" (important passenger comfort item, as the floor here is a pressure bulkhead and the fuel tanks below would track the -75 degree F OAT at altitude).*

*Advances in the port aft toilet and passenger door surround finish.*



*Aft starboard galley and toilet.*



## Progress Report for 2011, written by Bob Hood

The major 2011 effort focused on completing the previously started wing protection system. Very hard work done by the crew, including John Blum, Jeral Godfrey, Gary Hopper, and others toiled to protect the Comet's wings from corrosion. (By the end of 2010, we had found about 10 through skin corrosion sites in wing bottom skin.). (One example is shown in Figure 1). Our overall plan is to shield as much of the aircraft as possible from Puget Sound's very high humidity environment. To accomplish this, we worked on outside wing protection for most of the year.



Figure 1 Corrosion Damage to wing bottom skin

### THE LONG TERM PRESERVATION PLAN

The Comet's present status benefits from many years of preservation:

1. Removal of all external flight control surfaces, including the vertical and horizontal stabilizers, the rudder and elevators, all four flaps, and ailerons with trim tabs. These items are stored out of the weather in the hangar where they are available for year-round restoration. Most of this was done by the beginning of the year.
2. Flooding the rear fuselage and passenger compartment with dry air – continuing a process that has for more than a decade successfully arrested the very advanced aft fuselage corrosion we found at the beginning of restoration.
3. Further, since 2001, when the Comet nose was pulled into the Everett hangar, the fuselage forward of the wing roots has had protection for the forward passenger compartment and all cockpit openings.

Construction of a protective wing cover system was begun in 2011 to keep the wings in a controlled dry air environment using the same Munters dehumidifier that presently protects the Comet aft fuselage and the interior of the first Boeing 727. The whole Comet restoration crew will celebrate when the wing cover is complete because then the last Comet in the Western Hemisphere will be stabilized against further corrosion. Its future permanent preservation will wait until the Museum's planned large aircraft exhibit building has been funded and constructed.

When an assured controlled environment is available in Seattle at the Museum of Flight's main Boeing Field facility, the Everett Comet's wings will be separated from the fuselage, and the whole aircraft moved by flatbed trailer or Puget Sound barge from Paine Field to Boeing Field. There, after rejoining the wings and other external panels to the fuselage, the aircraft will be painted in the original Pan Am/Mexicana livery and put on display in the new building.

That is the general plan. Many time consuming and complex steps are underway to bring all of this about.

In the past year, we rigged a port wing cover support system, which included construction and installation of three major cable support beams roughly parallel with the main axis of the aircraft fuselage – one 36 foot long one over the fuselage centerline, then two 26 foot beams over the pannier tanks. This included special platforms constructed to fit over the pannier tanks to support the associated beam forward ends, and the manufacture of steel locating straps to positively secure the pannier tank beam supports and the side-to-side and lengthwise position of the fuselage top beam. Wing tip panels were removed and replaced by rigid cable mounting points. A portable ladder was built to reach from either port or starboard wing root to ease access to the fuselage top beam when installing the wing cover fabric.

The plastic fabric for wing top-and-bottom cover panels, and the large vertical panels forward and aft of the wings were formed by taking 12.5 foot wide strips of fire retardant plastic reinforced fabric (reclaimed from a construction site) and taping them together with special tape that claimed to form a chemical weld between adjacent sheets. (We were disappointed to later learn that these taped joints would prove to be the weak point in the concept.) A few weeks after mounting, the port wing top cover was torn due to more than 60 mph winds. Subsequently a system of through fabric battens was created to limit movement of the fabric under very high wind conditions. However, a critical look at the overall port wing result left us concerned we would not have a cover with low enough air leakage to make possible the low 35% Relative Humidity needed to stabilize wing internal corrosion.

So, after many hundreds of hours of effort, we returned to the drawing board.

With this experience behind it us, it now appears that the best step will be to encase the wings in a heavy (nine mil thick) ‘shrink-wrap’ plastic cover to block high winds and be impervious to water. Although this will be more costly than the original plan – which was limited to used materials donated to the Museum by local companies – it will give much better protection from the area’s average 75% relative humidity.

We are currently in fund raising mode to find the funds to complete the shrink-wrap operation.



*Figure 2 Pannier Tank Cable Support Beams*



*Figure 3 Wing Support Cover Cables*



*Figure 4 Assembling Wing Cover Fabric*



*Figure 5 First Fabric Over Port Wing Tip*

**MEANWHILE, PROGRESS CONTINUED ON THE AIRCRAFT INTERIOR AND EXTERNAL PANELS STORED IN THE HANGAR**

Viewed objectively, the quality of the ‘FIRST JET AIRLINER’ exhibit will really rest on the cumulative effect of a large number of small details. After all, we are trying to re-create the impressions that a visitor to the world’s first jet airliner would have had when he or she first stepped into the Comet – an exciting moment for the new passenger. The challenge is to impart their perception to modern 21st century Museum visitors.

The validity of that experience rests on the accurate execution of many small details. Although we began the year with much of the passenger cabin and forward galley units restored, many details were needed to closely duplicate the appearance of our aircraft in 1960 when it left Hatfield. This year, three to four volunteers spent their time to good advantage in this area. A partial list of items includes:

1. Design and construction of sheet metal covers for the modern seat leg-to-track’s joints to approximate the original appearance.
2. Completion of the small floor level panels at the center bulkhead pass-through, complete with removable fire extinguisher.
3. Further progress populating the many shelves in the five galley units, including two hot beverage dispensers on galley walls.



4. Upgrading forward entry passage and galley light fixtures to accept newly designed very low maintenance LED light sources.

5. Partial restoration of the aft passenger cabin wardrobe doors with preliminary alignment and hanging just aft of the passenger compartment.

6. With the help of our Scottish volunteer, we obtained the aft passenger door handle and associated hardware.

7. Took the first steps toward mounting the gray plastic quilted liner covers for the aft passenger and galley supply doors. The covers will be made from a roll of the original DH fabric found in the ex-Mexicana spare parts inventory.

8. Protected all passenger seats with removable plastic covers.

9. Designed and built a clear acrylic cover for the under carpet electric blanket installed over the center section's fuel tanks. (A placard on the adjacent bulkhead explains the blanket's function as an example of the creative design needed to deal with very hostile 7½ mile high environment.)

10. Cut and installed carpet in the aft passenger compartment, with retainer frames for the under-floor furnace vent and aileron control bay acrylic floor panel openings.

11. The last few passenger seats were attached to seat rails, and the final plastic seat track covers were cut and mounted.

12. Comet volunteer Gary Bovey gave us a new 46 inch flat screen monitor to introduce restoration visitors to the Comet project and to familiarize them with the Comet's history and background. The video presentation, which will include many Comet pioneers and former Comet pilot Peter Duffey, is being edited for presentation in a few months.

13. Many wing root fairings have been restored by a volunteer who recently completed his Everett Community College A & P training. They are stored above the Hangar floor workbenches (see Figure 5).

*Figure 5 Aft passenger compartment.*



*Figure 6 Wing root fairings under restoration.*



*Figure 7 Setting up the new flat screen presentation display.*

The major Comet interior event of the year was completion of the Aileron Control Bay exhibit. This compartment, with its clear acrylic floor panels clearly reveals the Comet designer's great care and many redundant features of the Comet's fly-by-hydraulics aileron control. (The aisle center acrylic panel is structurally supported by a carefully made look-alike beam fabricated to duplicate DH practice elsewhere.) Attention was given to reproducing all of the major cables, hydraulic lines and servo piston linkages in this compartment. A track light system using custom designed LED sources to avoid incandescent lamp burnout highlights the compartment's features, including the cabin pressure regulator assembly. Man-months of work beginning more than a decade ago are vindicated by the visually striking final result.



*Figure 8 Aileron Control Bay – aft baggage compartment barrier --- before (right) and after (left).*

Further work in the hangar concentrated on restoration of two port wing flaps, which were found to be in very poor condition with cracks and corrosion. The inboard flap's trailing edge has a milled aluminum wedge strip which had the advanced corrosion seen in Figure 10, and we did not have the resources to duplicate the part. Then, our Scottish volunteer again came to the rescue! He talked a friend into removing the same strip from a decommissioned Kinloss Nimrod flap and then mailed the part to us. Elsewhere, the flap panel's many cracks and patches required a surprisingly large time commitment. To finish flap restoration, we plan to build temporary flap bead blasting chambers in 2012 to clean up leading edges. After that, the panels will be corrosion protected and stored in the hangar's protected environment.



*Figure 9  
Aileron Control Bay under restoration.*



*Figure 10*



*Figure 11*

*Port inboard flap trailing edge – before restoration.*



*Figure 12*

*Port inner flap trailing edge – during restoration.*



*Figure 13*

*Finished flap trailing edge.*



This report concludes with grateful thanks for the dedication of the restoration crew – which continued with unabated progress during the project manager's two-month recovery from injury due to a serious fall from the wing pannier tank.

THE ENTIRE COMET CREW WISHES ITS MANY WORLDWIDE FRIENDS A HEALTHY AND SUCCESSFUL NEW YEAR !!!

***Robert B Hood***

## Written for the Summer 2012 DHAeTSA Newsletter by Bob Hood

Rab Logan has just organized shipment of a pair of vitally needed ex-Comet, ex-Nimrod aileron trim tabs to Everett, Washington. They will replace original parts suffering from fatal combination of corrosion and extreme hangar rash. This is another occasion to tell Rab and Linda that we are all grateful for all of their help in making this shipment possible.

I also want to pass on the thanks of the Comet Restoration Crew and the Seattle Museum of Flight for the generous contribution some years ago by DHAeTSA members to cover the cost of this shipment. The same pool of funds, kindly collected by DHAeTSA member Bob Wright, was also used to facilitate the earlier shipment of an entire landing gear set from Kinloss, Scotland to Everett, Washington.

Our gratitude knows no limits, but if anyone is moved to further support the last Western Hemisphere Comet (and the first Mk4C), we are now searching for money to protect its wings from internal corrosion due to our climate's 78% relative humidity.

The plan is to surround both wings with heavy gauge plastic shrink-wrap and pump dry air (at 20% relative humidity) into the space around them. The wrap's support cables are now in place, and we are attempting to defray the cost of the shrink-wrap itself. When done, we will have protected C/N 6424 from corrosion until the planned future controlled environment display hangar is funded and built.

The aircraft is now in the Paine Field Restoration Center hangar and any external parts (other than the wings) are routinely flooded with dry air. After shrink-wrapping the wings, the entire craft will be preserved for the foreseeable future.

With repeated and advance thanks from all of us,

**Robert B Hood**



*The new shrink wrap was in place for the winter of 2012/13, giving the wings their first dry winter since 1979.*

## DHAeTSA Fundraising

Included in one of Bob Hood's weekly team messages, in February 2013, he included the following appreciation:

Bob Wright, formerly of de Havilland Aircraft and Pilkington Glass, organized a 1990's DHAeTSA (de Havilland Aeronautical Technical School Association) fundraiser, which received funds to cover the shipping and packing cost of many parts sent to us from the UK during the restoration project. Last week he sent a final accounting along with a bank draft for the residual £318.83 (about \$499 USD).

A bit of history: soon after our project began in December 1996, Bob sent an appeal to his former associates for funds to support restoration of the first Comet Mk4C. About 48 individuals made contributions (in equivalent US dollars) ranging from \$313 to about \$40, with a total of about \$2800. Over the past seventeen years, those funds made a critical contribution to the very high cost of sending parts to Paine Field from shipping points as far away as Kinloss, Scotland and London, England. It is truly striking that many employees of a company that ceased to exist as a separate corporate entity in mid 1960 were willing to generously contribute to the restoration of one of its products half a century later. It says volumes about the high quality and *esprit* of the de Havilland organization and its people! Without this help, we would not have been able to get parts for an aircraft exhibit that, I believe, will reflect the best of the great creative and manufacturing contribution de Havilland's first jet airliner made to air travel.

Our warmest gratitude and thanks goes out to Bob and Monica Wright and their many de Havilland friends.

**Robert B Hood**

*See next page for image of certificate presented to Bob Wright*



**CERTIFICATE PRESENTED TO THE LATE BOB WRIGHT (1935-2016)**



**PRESENTATION CERTIFICATE**

To

**ROBERT W. WRIGHT**


IN APPRECIATION FOR THE GENEROUS SUPPORT to

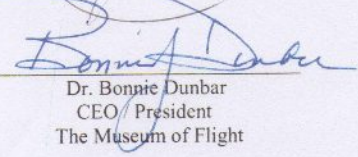
THE MUSEUM OF FLIGHT – SEATTLE, WA

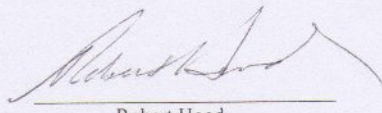
**DE HAVILLAND COMET MK4C – THE WORLD'S FIRST JETLINER  
RESTORATION PROJECT**

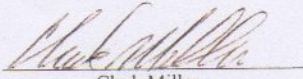
**THANK YOU!**

ON BEHALF OF THE MUSEUM'S STAFF AND VISITORS

  
Jim Goodall  
Project Manager  
Comet MK4C Restoration

  
Dr. Bonnie Dunbar  
CEO/President  
The Museum of Flight

  
Robert Hood  
Project Manager Emeritus  
Comet MK4C Restoration

  
Clark Miller  
Development Officer  
The Museum of Flight

9404 East Marginal Way South  
Seattle, WA 98108-4097  
Tel: 206.764.5700  
Fax: 206.764.5707  
www.museumofflight.org

**Progress during 2013**  
**(Compiled from Bob Hood's weekly team reports)**

Repair work has continued on ailerons, flaps and the vertical and horizontal stabilisers. After an extended debate about the best way to manage the awkward and heavy restored horizontal stabilizer discussing the possible, but limited, number of ways to move and store the panel, a call to Scottish volunteer Rab Logan, gave the answer: A threaded nut buried under the panel's top skin near its c.g. was strong enough to provide a needed lift point. The stock of DH bolts from the ex-Mexicana/ex-Redmond Air inventory produced just the right thread for that nut. Rab had warned about possible corrosion at the nut site, but this panel fortunately had no corrosion. The lift point nut and bolt with two elevator hinge connection points was used with the battery driven hangar fork lift to move the panel from its vertical work site into its original storage position on the wheeled dolly.



*Horizontal stabiliser before restoration.*

*Horizontal stabiliser after restoration.*



*Part of vertical stabiliser under restoration.*

*Vertical stabiliser after restoration.*





*Attention has been given to various areas of corrosion and repairs made as practical and necessary. This picture shows what was found when the fuselage belly skin was removed.*



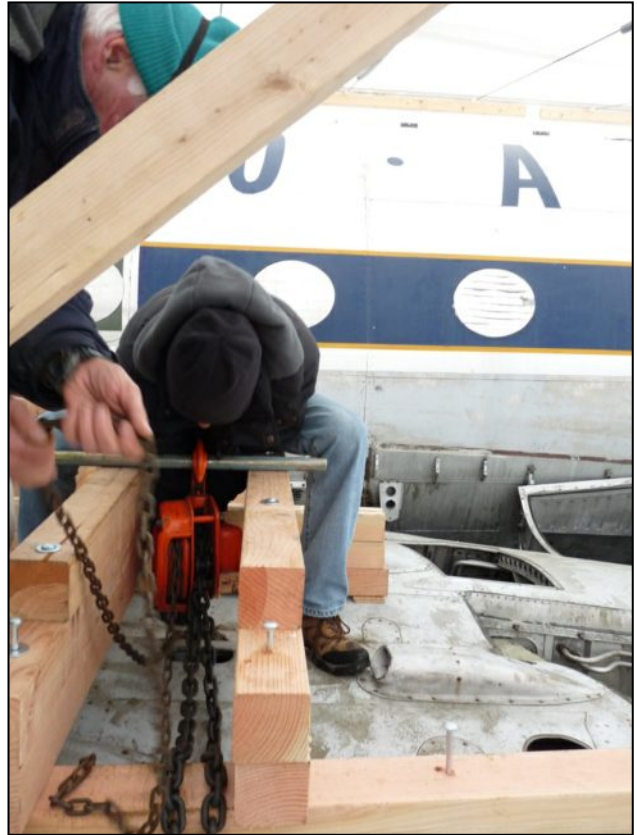
*The pictures below are before-and-after shots of corrosion found when the skin behind the starboard aft galley was removed.*



*The passenger cabin aisle between the two aft galleys (main passenger entry) has been refurbished, as shown below. Work has continued on the aft wardrobe area, where there was much rot and mechanical damage to the panel between the wardrobe and the aft baggage compartment.*



The major achievement of the last few months of 2013 was the removal of all four engines. Dollies and a hoist had first to be made. A prop to support the tail also had to be made, because engine removal made the c.g. move aft. The first two engines were removed in late December 2013 and the remaining two in January 2014.



*Above and left : lowering an engine.*

*A surprisingly clean engine bay.*



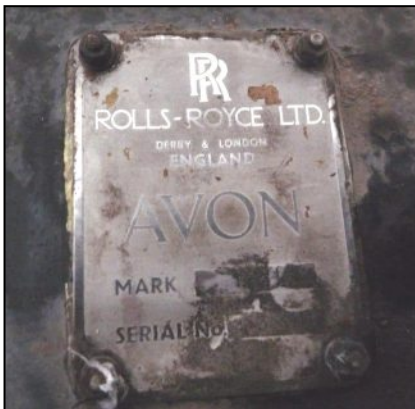




*Engine on dolly*

All four engines have very extensive corrosion damage to the magnesium inlet sections, with large white 'crumbles' lining the lower inlets and corroded see-through windows in parts of the casings.

The engine nameplates were removed and carefully cleaned up. An illustrated plaque is planned with the plates mounted over an outline of the Comet showing the engines' original position in the aircraft.



A very old DC power supply with a 60 ampere output capability, circa 1970s, has been found, which could eventually power an engine DC starter motor. The motor, in spite of 35 years' exposure to the elements, works flawlessly. It is therefore hoped that it might be possible to display a slowly-rotating engine.

Work on a thrust reverser assembly is in hand in the hope it can become a functional demonstration of this 'first commercial airliner thrust reverser'. The reversers are, in a way, the reason that the aircraft landed at Paine field on July 20, 1979. Hans von der Hoven, the Redmond Air pilot landed it in Everett, even though Redmond Air was based in Olympia at that time, to get Paine's longer runway so he didn't have to use the thrust reversers, which he believed were not trustworthy. As disassembly proceeded, many reasons to validate his good judgment were found. Most welds in the flange connecting the reverser to the rest of the exhaust tubing were broken and missing bolts in the reverser's clamshell doors plus generally shoddy maintenance practices showed that the contraptions were downright dangerous to use.

*Compiled by Roger de Mercado in February 2014 from recent Team Newsletters issued by Bob Hood.*

## Progress During 2014/2015

Work continues apace to prepare the aeroplane for display. The remaining tailplane will soon be reinstated, following extensive repair. A major task has been the restoration of the badly-corroded thrust reverser actuators to full and free movement. The No. 1 engine bay is being equipped with explanatory labels. The fuel tanks have been cleaned out - one was found to be full of fuel and water! The methyl-bromide engine fire extinguisher bottles have been removed and sent for recycling, thus removing a potential hazard. About half the bottles felt very light and were presumably empty. LED lighting is being installed in the aft baggage bay so that it can be viewed clearly.

New LED light elements in the flight engineer's worktable lamp have been installed with refreshingly bright results. It is now planned to make the same improvement to the lamp over the radio operator/navigator's table. The prospect of this improvement is so encouraging that a two level lighting system is being considered for the cockpit. It will create cockpit light levels that reproduce light intensities that would ---at its brightest--- be present when the aircraft is outside on a brightly sunlit day, while a lower light level is also available to show the normal in-hangar light intensity. Also being considered is an LED conversion of the original engineer's panel's many small incandescent light sources.

Work continues in the cabin, specifically in galley and wardrobe areas.

Ground maintenance placards have been attached to the main gear legs.

All four engines have been positioned under the starboard wing for display, allowing sight both of the engines and of the bays. Most of the engine bay doors were so corroded that new ones have had to be made.



*Thrust reverser mock-up*

A working mock-up of a thrust reverser assembly has been constructed, powered by air at 10psi - the service operating pressure was 75psi. A diagram showing the effect of the reverser will be displayed alongside. The Comet was the first jet airliner with thrust reverse.

In addition to work on the Comet itself, there has been an ongoing logistics effort to locate, catalogue and store all the off-aircraft and spare parts. Workshop facilities have been continually improved, as has the office accommodation. Former de Havilland people will recognise the familiar manuals on the bookshelves! Production managers of the past would have welcomed a view of the line from their office as good as that enjoyed by the restoration team.

Below right is the April 2015 Google Earth image, showing not a bat-plane, but the wings of the Comet shrouded in their plastic canopy. Below left is the May 2010 view in which the Comet wing profile is visible.



*Google Earth views of Museum of Flight's Restoration Center at Paine Field/Snohomish County Airport: left May 2010, right April 2015.*



*Maintenance placard*



*Comet office interior*



*View of Comet nose from the office*



## Retirement of Bob Hood

Bob Hood retired as Project Manager at the end of March 2015. Because we receive the weekly team news emails, we were included in the notice about a surprise party for him and we asked for “our grateful thanks and best wishes from all those in the de Havilland Aeronautical Technical School Association and indeed from all former DH people worldwide” to be given to him. This and other messages were read out. We had this reply from Bob:

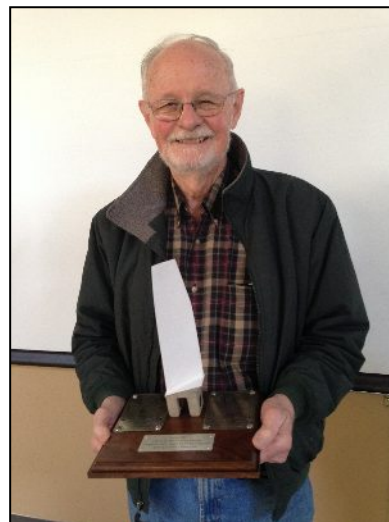
*“The support of the de Havilland Aeronautical Technical School Association has been a constant reinforcement to our efforts. Our many volunteers (more than 250 of them!) were gratified to know that the group of individual participants in the creation and manufacture of such a beautiful and revolutionary aircraft continue to be proud of de Havilland's great contribution to the way the entire world travels today --- more than half a century later!*

*It has been an honor and privilege to help preserve the product of such creative inspiration!*

*I am impressed by your group's continued personal support to restoration of this marvellous product of de Havilland --- a company that lost its separate identity more than a half-century ago. I have always taken their interest as strong proof of the high internal spirit of England's most significant 20th century aircraft manufacturer.*

*The first Comet Mk 4C will have an honored place for many decades at a new Museum of Flight exhibit”.*

Bob was presented with a mounted (new and unused!) Avon compressor blade flanked by two engine name plates. At this year's Volunteer Recognition Event, held at the Museum's Great Gallery, awards were made to those had given set numbers of hours, from 200 to 15,000. Just two people had achieved 15,000 hours, one being Bob. What a huge commitment!



## Comet in the News

On July 12 2015 The Herald of Everett published an article titled ‘At Paine Field, they're restoring seminal jetliner, the Comet’. The text is reproduced on pages 35-37. The article may still be online at [www.heraldnet.com/article/20150712/NEWS01/150719782](http://www.heraldnet.com/article/20150712/NEWS01/150719782)

## Death of Robert (Bob) Wright, November 2015

In recognition of the great help Bob gave to the Comet team. Bob Hood wrote:

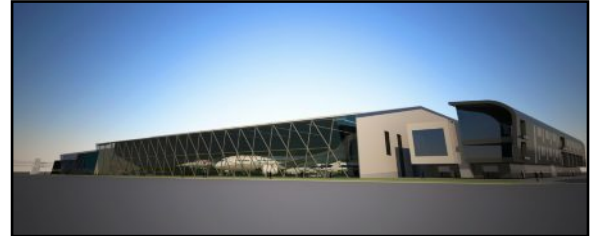
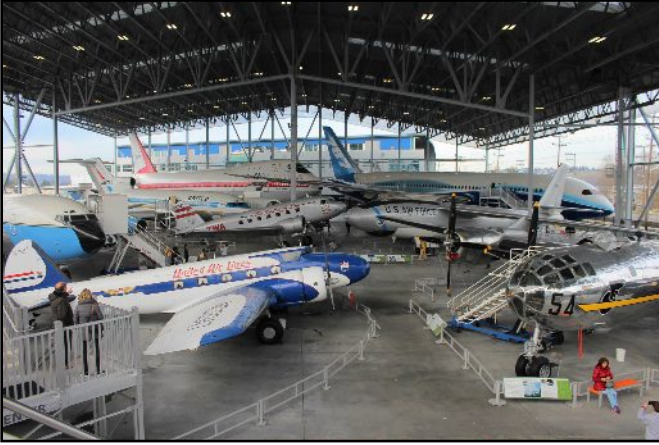
Bob Wright was a marketing executive for Pilkington Glass. Early in the restoration process, I found that the original windshield panels on our Comet had become opaque due to degradation of the evaporated gold electrical heating internal layer on the acrylic ‘glass’ from the attacks of time and moisture. In a telephone conversation with Bob, I said that the Museum did not want to have a Comet on display with blacked out windshield panels. He agreed and said he would look into the problem. A few weeks later, we received a large wooden box from Pilkington, with a complete set of ‘like new’ Nimrod Mk.2 windshield panels.

Years later, through the great generosity of the British Ministry of Defence, we were given a nearly airworthy complete set of Comet landing gear (about 3500lbs on 5 pallets) at the RAF's Kinloss airfield. We then had the problem of getting the landing gear from England to Seattle. I called Bob and discussed the difficulty in getting the heavy landing gear set shipped from England to Seattle. Bob promptly wrote letters pleading for help to the British Airways CEO and to Sir Richard Branson, CEO of Virgin Atlantic. So powerful was Bob's persuasive ability, that in several days, he had an answering call from Sir Richard Branson assigning one of his assistants to arrange to fly the landing gear from London to their Virgin Air terminal in San Francisco. In a generous contribution, Federal Express later moved the pallets via ground transport to Paine Field.

Another instance of Bob's help was years earlier, when he first began to support our restoration. He drove to Kinloss and convinced Robert (Rab) Logan, who was in charge of the maintenance of about 35 Nimrods, to call Paine Field and offer us his help. Since then, Rab Logan has been a critical source of used parts and practical advice for our restoration. Bob then wrote a fund raising letter to members of the de Havilland Aeronautical Technical School Association and collected about £3900 from 40 people – money that was banked and repeatedly used over the following years for postage to ship parts from Scotland to Paine Field. Our sincere thanks to all of those contributors.

## New Aviation Pavilion

On 6 April 2015 work began on The Museum of Flight's Aviation Pavilion – a structure that now houses nineteen rare and unique commercial and military aircraft. The Pavilion opened to the public on 26th June 2016. It is located between the Charles Simonyi Space Gallery and Raisbeck Aviation High School. The new facility is an open-air gallery covering a footprint of more than 140,000 square feet. The roof tapers from 90 ft to 55 ft. Aircraft that have been moved to the Pavilion include the Museum's recently restored Boeing 747, the 727 prototype that flew in to Everett in March 2016, the 787 Dreamliner, Air Force One, the Concorde airliner, the B-17, B-29 and B-47 bombers – but not yet the Comet.



## Update April 2019

Since the retirement of Bob Hood there have been no regular communications from the team. Hopes of the Comet being positioned in the Aviation Pavilion in the near future seem to have faded. The airframe was still incomplete when viewed in December 2018. DHAeTSA member Roy Branson, who has been a Docent at the Museum of Flight for 14 years, visited that month and reported *“The interior is almost complete. It’s beautiful. The seats are installed together with the galleys, toilets and hat racks. Unfortunately, the structure is in bad shape – lots of corrosion. It’s going to be another few years before they can put that thing back together properly. When they’ve done that, it’ll be moved down to the museum to be on display there.”* He added *“That Comet holds memories for me. The first job I had after Astwick Manor was in the wing shop, bolting on the lower wing skins. Guess who had to climb up through the manholes into the fuel tanks with a spanner (aka wrench)! I also helped build miles of hat racks in the fuse shop. There’s a good chance I actually helped build our Comet in 1958.”*

Roy sent many photos, some of which are shown on the next two pages, also that below.

*Near the Comet is the mockup of the Boeing SST nose portions.*







*The rear fuselage is still exposed*



*The forward fuselage remains protected.  
Just visible on the right is the Golden Aztec emblem*



*The rudder*



*Main landing gear (ex Nimrod)*



*The tailplane*



*Inner wing (under sheeting)*





*Spare Avon RA29*



*The original engines*



*Thrust reverser demonstration module*



*Pinion tank and support*



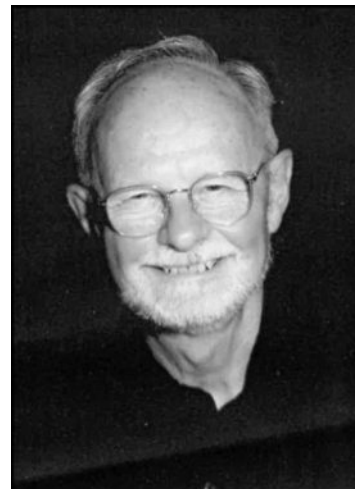
*Re-skinned area of fuselage*



## Obituary of Bob Hood

Everett Herald 26 Apr 2020

Robert B. Hood December 11, 1932 - April 3, 2020 With love and sadness, the Hood family announces Bob's passing at Quail Park, Lynnwood, WA. Bob grew up in southern Delaware and New York City. Following graduation at Brooklyn Technical High School, he spent four years with the Air Force in Korea. Upon discharge, he earned a BSEE degree from the University of Michigan, where he met and married his wife, Sandra. Following an early position at Fairchild Semiconductor in California, the Hoods moved to Washington State, where he became Chief Engineer at the Lodec Company of Lynnwood. He was an active member and twice president of the Everett Central Lions Club. Upon retirement, his lifelong love of aviation made him an enthusiastic volunteer at the Museum of Flight's Restoration Facility at Paine Field. Initially he worked on the Boeing 247. This was followed by thousands of hours working on the 4C DeHavilland Comet. He leaves behind his wife of 58 years and their three children: Heather (Joe) Dody, Robert W., and Lara (Ricardo) Balazs; and four grandchildren.





## At Paine Field, they're restoring seminal jetliner, the Comet

By Dan Catchpole Herald Writer

Saturday, July 11, 2015 10:18am

EVERETT — The old jetliner's interior hardly resembles what it looked like 20 years ago.

Slime and mold covered nearly every surface of the de Havilland Comet 4C when the Museum of Flight got it in 1995. It had already spent more than a decade parked outside at Paine Field. The historic airplane's aluminum body was riddled with holes from corrosion.

The Comet is a classic it launched the jet age in 1952, and many thought Britain might dominate the jetliner market. But just as the airplane introduced many innovations, it taught painful lessons about the pressures and stresses put on passenger jet airplanes.

For the past two decades, hundreds of volunteers have put in more than 200,000 hours restoring the historical jetliner at the museum's Restoration Center at Paine Field, said Tom Cathcart, the museum's director of aircraft restoration.

"Just about everything in here has been removed and reinstalled," he said.

The volunteers have cleaned, repaired or replaced everything from the gauges and rows of toggles in the cockpit to the shining stainless steel fore galley and the light-beige seat upholstery on the 81 seats. The jet is a time machine, said Bob Hood, the volunteer who ran the project until stepping down earlier this year, "When people step into it, it will look almost exactly how it did" when it was built in 1959.

Cathcart figures the Comet restoration project is about 70 percent finished.

Its flying days are over, though. When it moves to Seattle to go on permanent display in the next few years, it will get there by barge or by truck, he said.

Its place in the museum's collection was never in doubt.

A de Havilland Comet 1 operated by the British Overseas Airways Corporation changed the world on May 2, 1952, when it left London bound for Johannesburg on the first commercial jet flight. A one-way return ticket in today's dollars cost about \$8,000.

The British-built airplane offered flyers a smoother, faster and quieter ride relative to the prop planes that dominated the skies, such as the Lockheed Constellation and Douglas DC-7. It cut hours, even days off travel times.

The sleek jetliner incorporated several technological advances, including hydraulic-power flight controls and landing gear assemblies with multiple wheels — called bogie landing gear.

Its four engines were buried in the wings rather than hung below, giving it clean, aerodynamic lines.

"It was a beautiful piece of aluminum sculpture," Hood said.

The creation of the jetliner was in itself remarkable. The idea for the airplane came in the depths of World War II. While most of the country was focused on defeating the Axis powers, a UK government committee led by British aviation pioneer Lord Brabazon tried to anticipate the types of passenger airplanes the country and its far-flung empire would need after the war.

De Havilland committed to building a jetliner in 1943, though intensive design did not start until 1946. It only took three years to go from the drawing board to the prototype Comet 1's first flight. It was a genuine conceptual breakthrough, said Keith Hayward, a Royal Aeronautical Society fellow who has written extensively about the post-war and current aerospace industry in the UK.

The Comet 1 only had room for 44 passengers in a typical layout and a range of about 1,500 miles. While it was too small and its range was too short for it to be anything more than a technology demonstrator, "it still caught a wave of orders and helped to push Americans into their jet designs," he said.



The follow-on version, the Comet 3, “was the real deal,” he said. It could hold enough passengers — 58 to 76 — for airlines to make money flying it. A one-way ticket from London to New York on a BOAC flight in 1958 cost the equivalent of \$3,561 today.

Many in the UK thought that the Comet and the country’s aerospace industry were poised to dominate the jetliner market for years to come.

But the industry was still learning about jet travel.

For its jet engines to work efficiently, the Comet had to fly at about 40,000 feet, far above where propeller planes operated. Like current jetliners, the Comet’s cabin was pressurized to about 8,000 feet in flight. That difference in pressures put stress on the airplane’s body.

After wowing the world in 1952, three Comets crashed in high-profile accidents during the next two years. Everyone on the three airplanes, 99 people in all, died.

After the last crash in 1954, the Comet fleet was grounded. Aviation authorities in the UK launched an extensive investigation to figure out why Comets were coming out of the sky.

The committee’s work changed accident investigation practices around the world.

Using the latest available scientific technologies and forensic methods, investigators located and salvaged one of the aircraft’s remains from the Mediterranean Sea. Then they reconstructed the airplane to determine possible causes. They tested their lead theory — structural failure and explosive cabin depressurization — by putting a Comet in a giant water tank and changing the water pressure inside the cabin to simulate repeated flights.

After thousands of simulated flights, the Comet’s body tore apart, confirming the airplane’s design flaws.

The Comet’s designers had not understood just how much wear and tear repeated pressurization and depressurization put on the airframe, or that the new method of punching out rivet holes produced microscopic stress fractures in the metal skin. They also didn’t understand that the mostly square shape of the airplane’s windows concentrated stress around the corners, rather than distributing the stress, as with oval-shaped windows.

As a result, cracks formed and spread in the skin of three Comets, causing the fuselages to tear apart in flight.

At the time, Lord Brabazon said, “In every step and progress, we’ve had to pay for it in blood and in treasure. And, God knows that in this case we have paid in full.”

The de Havilland company redesigned the airplane, producing the Comet 4, the variant owned by the Museum of Flight.

The Comet 4 entered service in 1958, but it was followed a few weeks later by the Boeing 707. The Douglas DC-8 came along in 1959.

Airlines could make more money off of the two larger, more fuel-efficient American airplanes, which quickly dominated the early jetliner market. Airlines eventually ordered 1,010 707s and 556 DC-8s. Only 114 Comets were ever delivered.

De Havilland never recovered.

“The Comet failure was a blow to morale” in the UK aerospace industry, Hayward said. But its subsequent failure had more to do with a lack of industrial capacity and capital, and designs driven by state-owned airlines, which “fatally injured wider sales prospects.”

It was “all a bit of a mess and hubris,” he said.

A modified Comet called the Nimrod was used by the Royal Air Forces until 2011. The UK Ministry of Defence provided several spare Nimrod parts to the restoration project.

The museum’s Comet 4 was delivered to Mexicana Airlines in 1960, the first of three Comets flown by the airline. It was used in the airline’s “Golden Aztec” jet service. A massive, hand-painted Aztec calendar adorned the airplane’s vertical fin.

The fin is currently disassembled, leaning against a wall in one of the Restoration Center’s hangars.

Mexicana parked its Comets in 1970, and later sold two to an airplane broker in Arizona. One of those was then sold to a subscription airline based in Redmond. While flying to Olympia in 1979, an engine warning light came on, and the airplane diverted to Paine Field. Federal aviation authorities grounded the airplane due to its questionable maintenance history.

“It came here and it never left,” Cathcart said.

For several years, the Everett Community College used it for its aircraft and powerplant mechanic training program. The college donated it to the museum in 1995.

The Comet is parked, part inside the hangar, part outside. It’s wings are too wide to fit inside the building, so they are covered with a giant, improvised tent made of white plastic sheets supported by two-by-fours.

A balcony ringing the hangar inside is packed with spare parts, everything from a radio direction finder for navigation to the skins covering the engine exhausts.

If volunteers can’t find a spare, they have to make it, a process that requires a lot of research and some guesswork. Often the machining is done by 100-year-old volunteer Jim Jackson.

De Havilland merged in the 1960s and again in the 1970s. At some point, the original design specifications for the Comet were thrown out. So, all the restoration volunteers have to go by are two shelves of blue binders of maintenance manuals, overhaul manuals and parts catalogs that came from Mexicana. The well-worn books have detailed drawings showing how and where everything on the airplane belongs from the smallest screw to the massive jet engines.

But there are no dimensions for the parts, no specifications for how they are made, said Paul Lehtinen, who’s volunteered on the project for nearly five years.

On Wednesday, he was attaching pressed metal trim to an access panel cover for one of the rear bathrooms. The trim had to be machined in a tool shop in the hangar.

Designing, producing and attaching the quarter-inch wide trim took weeks, he said.

Much of the rear bathrooms and galley is still torn up. Tools and spare materials are scattered about.

“I see a lifetime of work here,” he said. “It keeps me thinking ‘cause I’m constantly trying to solve problems.”

Like many of the project’s volunteers, the 71-year-old is retired, a former welder and equipment installer. That experience serves him well on the Comet, where he spends about 20 hours a week.

“Nuts and bolts are still nuts and bolts whether on an airplane or a tractor,” the Everett resident said.

De Havilland Comet

Location: Museum of Flight Restoration Center

Manufacturer: De Havilland Aircraft Company Ltd.

Model: D.H. 106 Comet Mk. 4C

Year: 1959

Serial Number: 6424

Registration: N888WA

Capacity: 71 passengers (22 first class)

Wingspan: 114.83 ft

Length: 118 ft

Height: 29 ft

Cruise Speed: 503 mph

Power Plant: Four Rolls-Royce Avon 525B engines

Range: 2,650 miles

Source: Museum of Flight