

British Airways London Eye - the people behind the project

It took seven years and the expertise of hundreds of people from across Europe to turn the dream into a reality.

Marks Barfield Architects: the originators and architects

British Airways London Eye was conceived and designed by David Marks and Julia Barfield. The husband and wife team first attracted attention in 1989 when they won an engineering competition to design a Bridge of the Future. The proposal was for a single span across the Grand Canyon based on the structural principle of a dinosaur spine. Later, they designed an innovative multi-faceted project for the World Sea Centre in the Bay of Toulon featuring the Aquasphere, an imaginative and dramatic aquarium in the sea. Recent projects include an award-winning watersports centre in Liverpool built within Queen's Dock, an aviation museum in Riyadh and the environmental transformation of Stoke Newington Reservoir in North London. David Marks and Julia Barfield are both directors of the British Airways London Eye.

British Airways: the project champions

Britain's leading airline is also one of the world's biggest international airlines, carrying 45 million passengers to 168 destinations in 87 countries. British Airways brings more overseas visitors to London and the UK than any other operator. As a founding member of Oneworld, it is at the heart of the world's leading international airline alliance.

The airline has built a worldwide reputation for the high quality of its customer service and for its track record and innovation. British Airways has championed British Airways London Eye since 1996.

Tussauds Group: the operators

British Airways London Eye is operated and managed by Europe's leading operators of visitor attractions, The Tussauds Group. The Tussauds Group is responsible for managing some of the most popular attractions in the world including Madame Tussaud's (in London, Amsterdam, Hong Kong, New York and Las Vegas), the London Planetarium, Warwick Castle, Alton Towers, Chessington World of Adventures and Thorpe Park. The company has recently added Heide Park in Germany to its overseas portfolio.

The Tussauds Group's unique expertise has helped to establish British Airways London Eye as a must do attraction for Londoners and visitors alike, attracting an astonishing 3.5 million passengers in its first year.

Mace: the project managers

As one of the UK's leading project management companies, Mace is used to facing construction challenges although none quite like British Airways London Eye. Established in London ten years ago, Mace employs over 500 people in the UK and overseas. The largest independent consultancy of its type, it takes a holistic approach to projects, supporting clients from inception to completion and beyond.

The company's primary disciplines of consultancy, project management and construction management are backed by a range of tailored projects from hotels and leisure facilities to airports, museums and major civil engineering schemes. Just some of the high profile projects Mace has been involved with recently include British Airways corporate offices at Waterside, The British Museum Great Court project, the BFI Imax cinema in Waterloo and the complex £21million redevelopment of the Gatwick Airport South Terminal Lounge for BAA.

Hollandia: the steelwork engineers

With more than seventy years experience in the design, management and fabrication of steel structures, Dutch company, Hollandia, was responsible for making the world's biggest wheel rim, using 1,600 tonnes of British steel. As well as providing the expertise to build the steel structure, Hollandia's experience in transporting heavy items by water was crucial to the construction of British Airways London Eye.

Each component part was transported from their waterside plant at Krimpen by inland waterway to the North Sea and, eventually, along the River Thames to County Hall. Hollandia's list of projects is impressive and varied, including every conceivable type of bridge, airport hangars, oil refineries, high tension pylons and river barriers.

In the UK, the company was involved in the re-development of Canary Wharf and built the Building Exchange House at Liverpool Street Station, a ten-storey building supported by a bridge structure. Hollandia is also currently working on the renovation of another world first - a 100 year old monorail in Wuppertal, Germany.

POMA: the capsule constructors

The fully enclosed, high-tech passenger capsules were built by the world's leading manufacturer of cable transport systems, the French company POMA. POMA was formed in 1936 when its founder designed and built the first modern ski-lift at l'Alpe d'Huez. Since then the company has been responsible for a number of firsts, including the first three-seater chair lift, thousands of ski-lift systems, numerous passenger shuttles and some spectacular funiculars including the renovated system at Montmartre, Paris. In the UK, POMA manufactured the gondola lift at Alton Towers.

All of the company's far reaching expertise was called upon to build the British Airways London Eye's unique passenger capsules. A technologically advanced stability system was developed to ensure a smooth ride and to enable passengers to walk around the capsules freely. The large glass windows that surround passengers ensure that the views are magnificent and, because the capsules are mounted on the outside rim of the wheel structure, views are also totally unobstructed.

The partnership

British Airways London Eye is a privately funded partnership between British Airways, the Tussauds Group and Marks Barfield Architects. Financing for the project was provided by Westdeutsche Landesbank and Sumitomo Bank.

British Airways London Eye - an accomplishment of design and engineering

British Airways London Eye is one of the most imaginative and audacious projects ever seen. As well as creating a dramatic new landmark for one of the world's most famous skylines, it also provides a unique and exciting vantage point for Londoners and visitors alike. Conceived and designed by David Marks and Julia Barfield, the London Eye continues the great tradition of celebratory structures, such as the Eiffel Tower built for Paris in 1889, but the technology employed sets a new standard for architectural and engineering innovation.

The design

When the press called for ways to celebrate the Millennium, various landmarks and monuments were proposed but architects David Marks and Julia Barfield felt that it should be more than that. Their vision was to create a beautiful structure that would also allow people to see one of the world's greatest cities from a new perspective.

The concept of a wheel was an ideal symbol for London in the Millennium. As well as representing the turning of the century, a wheel is a universally recognised symbol of time and regeneration. It also introduces a new shape into the rectilinear city. Like the Eiffel Tower and the Statue of Liberty, where people enter the structure and gain new perspectives of the cities below, an observation wheel allows people to actively participate in the experience.

The involvement of British Airways in 1996 and then, in 1998, The Tussauds Group enabled the vision of the architects to be transformed into reality.

The technology

British Airways London Eye is the largest observation wheel ever built, and the fourth tallest structure in London. Its design called for innovative solutions to solve some of the difficult and unusual challenges thrown up by construction on this scale.

Drawing on technologies more associated with bridges, buildings and vehicles the design team has created an intelligent structure, able to respond to wind and other weather conditions. And, while it has the Ferris Wheel as its predecessor, it is a completely unique design in three key ways. Firstly, the passenger capsules are fully enclosed. Secondly, they are on the outside of the wheel structure and are motorised. And, thirdly, the entire structure is supported by an A frame from one side only.

The capsules

Visitors ride British Airways London Eye in one of 32 specially designed capsules, each able to hold up to 25 people comfortably. The large glass windows which surround passengers ensure the views are magnificent and, because the capsules are secured to the outer rim of the wheel, the views are totally unobstructed.

Passengers can walk freely around inside the capsules which are kept level by a motorised motion stability system. Seating is provided and all capsules are temperature controlled to ensure passengers are comfortable. Each capsule is in touch with the ground via camera and radio links.

The hub and spindle

The spindle at the centre of the wheel structure and the hub, which rotates the wheel around the spindle, was specially designed and manufactured for the largest observation wheel ever built. The spindle is 23 metres (75ft) high, which is around the height of a church spire, and the combined weight of the hub and spindle is 330 tonnes, heavier than St Stephen's eponymous bell, Big Ben.

The hub and spindle are supported by two 60 metre high tapered columns called the A frame. What makes the structure so unusual is that it is supported from one side only. Six huge cables secure the rear of the spindle to an underground anchor.

The rim

British Airways London Eye is like a giant bicycle wheel. It comprises a triangular truss with one inner chord and two outer chords made of steel tubes with bracing between them. Sixty-four cables run from the hub, which rotates around the spindle, to the inner chord. They keep the rim at a constant distance from the hub. Sixteen cables then join the outer chords to the hub and this keeps the wheel stiff as it rotates. Many observation wheels in the past had cable slack during rotation, leading to fatigue in the cable connections. The London Eye cables are pre-stressed to avoid this.

The control of the wind

The wind is the most crucial factor affecting the design of observation wheels. Advanced wind engineering technology is therefore one of the most important innovations employed in British Airways London Eye's design. The structure has been designed to be safe in all wind conditions and, indeed, to respond to them.

The capsules are aerodynamically shaped for least resistance and tuned mass dampers are fixed to the outer rim to prevent the wheel from vibrating at its natural frequency. Computer simulations and stimulus tests have been used to calculate the reaction of all the individual parts of the wheel to different wind conditions. These intelligent systems ensure passengers experience a smooth and safe journey.

Boarding and disembarkation

In the past, observation wheels operated on a stop/start basis to allow for boarding and disembarkation. British Airways London Eye revolves continuously at a quarter of the average walking speed enabling passengers to walk straight into and out of the gently moving capsules.

The lighting

The trees lining the approach to British Airways London Eye are bathed in green light – a design based on the Champs Elysees in Paris.

The boarding platform appears to float on a cloud of blue light. During night flights, the capsules are well lit as passengers embark and gradually fade through cobalt blue to darkness.

British Airways London Eye - facts and figures

Sweeping the skyline at 135m, British Airways London Eye is the world's largest observation wheel. A unique accomplishment of engineering and design, it offers birds-eye views of the capital for over 25 miles in every direction.

- The design is similar to a giant bicycle wheel with a central hub and spindle connected to outer and inner rims by fine cable spokes. However, at nearly three times as high as Tower Bridge and four times wider than the dome of St Paul's Cathedral, it is over 200 times bigger than the average racing bike wheel.
- The 80 spokes consist of a total of 6km of cables; laid flat they would run from Trafalgar Square to Canary Wharf.
- The spindle holds the wheel structure and the hub rotates it around the spindle. At 23 metres tall, the spindle is around the size of a church spire and, together with the hub, weighs in at 330 tonnes: over 20 times heavier than Big Ben.

- 1,700 tonnes of British steel have been used in the construction of British Airways London Eye, which makes it heavier than 250 double decker buses, 280 adult African elephants or 1200 rugby league teams.
- It took over a week to lift British Airways London Eye fully vertical from a horizontal position across the Thames. This kind of procedure was only previously attempted in oil rigging operations.
- British Airways London Eye will turn continuously, an average of 8,000 revolutions per year.
- The 32 high-tech passenger capsules can carry over 15,000 visitors a day, enough to fill Concorde 160 times over.
- Passengers can see over 25 miles in each direction and are treated to aerial views of some of the world's most famous sights including St Paul's, the Palace of Westminster and Windsor Castle.
- British Airways London Eye is the capital's fourth tallest structure with only Canary Wharf, Tower 42 and London Telecom Tower standing taller. It is over 35 metres taller than Big Ben, nearly 30 metres taller than St Paul's Cathedral, almost three times as high as Tower Bridge and nearly a third again the size of the Statue of Liberty. It is the highest structure in the UK which is open to the public.
- At 135m, the London Eye is over twice the height of the famous Prater Wheel in Vienna seen in the classic film, The Third Man, and outstrips the previous tallest observation wheel in Yokohama Bay, Japan by 30 metres.
- Unlike the Prater Wheel, however, British Airways London Eye is not a Ferris wheel because of three key differences. Firstly, the passenger capsules are fully enclosed. Secondly, they are positioned on the outside of the wheel structure and are fully motorised. And, thirdly, the entire structure is supported by an A frame from one side only.
- Architects David Marks and Julia Barfield first came up with the idea for British Airways London Eye as an entry for a Millennium celebration competition. It took seven years and the expertise of hundreds of people from five European countries to turn the dream into a reality.
- In its first year of operation, 3.5m people visited the British Airways London Eye and saw the capital from a totally new perspective.
- Tickets start at £8.50 for adults and £5.00 for children under 16. Children under five go free. Tickets can be booked in advance on 0870 5000 600. Group bookings can be made on 0870 400 3005.
- British Airways London Eye is open all year. Opening hours during the winter are 10.00am to 7.00pm and, in summer, from 9.30am to 10.00pm.

British Airways London Eye - vital statistics

As London's fourth tallest structure and the world's tallest observation wheel, British Airways London Eye's vital statistics are impressive.

Height	135 metres (443ft)
Weight of wheel and capsules	2,100 tonne
Circumference	424 metres (1,392ft)
Number of passenger capsules	32
Weight per passenger capsule	10 tonne
Number of cables	80
Total length of cables	6km (over 3.5 miles)
Driving power	150kw
Duration of ride	30 minutes
Speed per revolution	0.26 metres per second
Number of passengers per revolution	800
Number of revolutions per year	Average of 8,000
Number of passengers per year	3.5 million
Viewing distance from top	Over 25 miles

British Airways London Eye - what you can see

British Airways London Eye is the world's largest observation wheel offering fantastic panoramic views across London and a unique perspective on some of London's most famous landmarks.

Once on the Eye, guests can orientate themselves from the N, S, E and W signs clearly marked on each side of the capsule, and then see how many of the following they can spot:

Looking west

- **Buckingham Palace:** the official residence of the British Monarchy. If the flag is flying, the Queen is home.
- **Royal Albert Hall:** home to the Proms since 1941, the Hall, seen from above, is oval and not as round as is often thought. Its glass and iron dome is 135 feet (40.5m) high.
- **Lord's Cricket Ground:** named after Thomas Lord who moved his Marylebone Cricket Club (MCC) here in 1814, Lord's is one of the country's most historic cricket grounds. International cricket is played here and you can clearly see the toll that a busy season takes on the wicket.
- **Trafalgar Square:** one of the most famous landmarks in London and home to Nelson's Column, which was built to celebrate Nelson's victory at the Battle of Trafalgar.

Other landmarks to the west include Number 10 Downing Street, the London Planetarium and Madame Tussaud's, Piccadilly Circus, Horse Guard's Parade and, on a clear day, Windsor Castle.

Looking north

- **BT Tower:** at 584 feet high (177.5m), it is the third tallest building in Britain. It has 57 microwave radio aerials on top that it uses for transmissions.
- **Cleopatra's Needle:** carved from pink granite in Egypt in c.1475 BC, Cleopatra's Needle is older than London. One of a pair, its twin stands in Place de la Concorde in Paris.

- **Covent Garden:** the famous architect Inigo Jones was commissioned to build this Piazza in 1631. As funds ran low, it was to be 'not much better than a barn'.

Other landmarks to the north include Alexandra Palace, Embankment Place, Royal Courts of Justice, Somerset House and the Savoy Hotel.

Looking east

- **St Paul's Cathedral:** built in the traditional shape of a Latin cross, St Paul's is a reminder of London's past among the modern architecture of the city's financial centre.
- **Tower Bridge:** London's most famous bridge was built after street riots by angry citizens fed up with having to cross the river by boat.
- **Tower 42:** at night Britain's second tallest building is identified by its electric blue roof lighting.

Other sites to the east include The Lloyds Building, Oxo Tower, Tate Modern, BFI London IMAX, Thames Barrier, Canary Wharf and the Millennium Dome.

Looking south-west

- **The Houses of Parliament:** the House of Commons and the House of Lords are easily distinguishable by the colour of their awnings. Red for the Lords and green for the Commons. Westminster Bridge and Lambeth Bridge echo these colours.
- **Big Ben:** one of London's most famous landmarks, Big Ben actually refers to the bell inside the tower and not the clock tower itself, which is called St Stephen's.
- **Westminster Abbey:** consecrated in 1065 and built because Edward the Confessor wanted to make Westminster the base of his government. The country is still governed from Westminster and, with the exception of only two, every monarch since 1066 has been crowned here.
- **Battersea Power Station:** now a listed building and host to concerts, plays and exhibitions. The distinctive white towers are 300 feet (90m) high.

Other landmarks include Winston Churchill's statue, MI6 Headquarters, Imperial War Museum and the Tate Gallery.

The Eye at night

Views of London by night are particularly beautiful from the Eye. Highlights include St Paul's Cathedral, Embankment Pier, Tower 42, Oxo Tower, Canary Wharf, Chinatown, the Houses of Parliament and Somerset House. The largest clock face in Europe is illuminated on the former Shell Building on the North bank.

British Airways London Eye - our place in the community

We are delighted to be part of a vibrant and mixed community and, over the past year, have been involved in every aspect of local life. The Eye has become a symbol for London and its Christmas illuminations placed it at the heart of the community.

'The Eye has become a memorable feature of London projecting a sense of modernity and excitement. An achievement of which Londoners can feel truly proud.'

Ken Livingstone, Mayor of London

'The London Eye has become the most visible icon of London. It really makes a difference for us helping to convey a fresh, vibrant image of London and, indeed, of Britain.'

David Quarmby, Chairman British Tourist Authority

Charities and the local community

With an average of 10,000 visitors a day, pressure on local facilities and the surrounding area has certainly increased. We are committed to constantly monitoring and improving the area around the Eye. These activities include a more efficient queuing system to relieve congestion and, in partnership with Lambeth council and the police, a campaign to rid the area of illegal traders. We have also agreed with Lambeth council to take on the management of coach bays in Belvedere Road.

British Airways London Eye is committed to social responsibility. As well as offering free flights to local residents, employing staff from the borough and buying local services, we also support a wide range of charities. Our two chosen charities are Sight Savers International, which is committed to reversing and preventing blindness, and the Waterloo Millennium Green Trust.

In our first year, we have also supported hundreds of charities by donating tickets for raffles and auctions, including Lambeth Contact-A-Family, King's College Hospital Asthma Trust, the Queen's Walk Trust, St Thomas Hospital's Tommy's Campaign, The Lupus Trust, the Royal British Legion, Marie Curie Cancer Relief, MacMillan Nurses, Community Links, Imperial Cancer Research, The London Fire Brigade and many more.

'St. Thomas' Hospital is very much part of the local South Bank community, and we already have great affection for the London Eye. Staff and patients enjoy it every day.'

Patricia Moberley, Chairman of Guy's and St. Thomas' NHS Trust

In October 2000, the wheel was illuminated pink in support of Breast Cancer Awareness Month and, when it was auctioned for a Whizz Kidz charity event, enough funds were raised to provide mobility equipment for 63 children. On Armistice Day, the wheel stopped to observe two minutes' silence in support of the Royal British Legion Poppy Appeal and in memory of the men and women who died for Britain in two world wars.

Local business

We are delighted that the Eye is able to play a key role in the overall regeneration of the South Bank, as restaurants, bars and other facilities locate here. We hope to continue making a positive impact on the long term regeneration of the area.

'Now the heartbeat of South London, the British Airways London Eye has provided the energy for regeneration. It has brought over 3 million people to the area, increasing our business by a third.'

Justin Green, General Manager, All Bar One

'It's a great addition to the area – we think it's something special. It's not just gorgeous to look at but it's done wonders for business too.'

Judith and Mike Clark, Managers, The Mulberry Bush

'We're the Eye's biggest fan. I can safely say that business trebled overnight when it opened. The effect on the area has been fantastic; the South Bank has come alive.'

Ben Evans, Manager, Bar Med

Education

Schools and youth organisations are provided with discounted admissions to the Eye and, in February 2001, over 1500 schoolchildren from Lambeth schools were treated to a night flight. The Eye was also the inspiration for a special environmental calendar produced by children for the borough of Westminster.

A teaching pack produced by the London Eye, initially circulated in schools across Lambeth, Westminster and Southwark, received very positive feedback and is now available nationally. The first internet-based guide to the capital for schoolchildren - Kids Link - was launched by the Eye. British Airways London Eye is also part of the A level physics text book and the Science Museum is including a capsule and a model of the structure in a new exhibition.

British Airways London Eye – corporate events and entertaining

The Corporate and Special Events Department at British Airways London Eye has seen a very successful first year with a wide range of exciting and high profile events.

Services range from hiring a single capsule to after hours exclusive use of the Eye and Flight Zone. It is ideal for client entertaining, product launches, exclusive evening flights and cocktail parties. The Eye's event facilities were launched in September 2000 when 500 guests from the event industry enjoyed a evening champagne flight.

Since then there have been a number of unusual events at the Eye. In December, Schroder Solomon Smith Barney hired the entire Eye for a children's Christmas party. Over 150 children and their families enjoyed a private flight, with binoculars and guide books added for extra fun.

Segmenta PR entertained 600 guests on an exclusive night flight which included champagne and canapé service, ensuring their guests felt like true VIP's.

In October 2000, the Eye was lit pink for Breast Cancer Awareness Month. Actress and super-model Elizabeth Hurley, the face of Estee Lauder, flicked the switch which flooded the Eye in pink lights. The event rounded off a month of pink global moments to raise awareness about breast cancer. Other world famous landmarks involved in the campaign included the Statue of Liberty, Sydney Harbour Bridge and Table Mountain.

A smaller event saw Cartier fill a capsule with rare and precious jewels to launch their new collection. A glass display cabinet was fitted over the central bench in a capsule and guests were able to view the collection throughout the day.

May 2001 saw the first wedding on the London Eye. The happy couple were the lucky winners of a national search by British Airways London Eye and GMTV. GMTV covered the preparations for their unique special day and the wedding itself was broadcast live on the GMTV breakfast show. Weddings are now available at the Eye with a range of excellent packages to ensure a perfect day for everyone.

British Airways London Eye – contacts and further information

Our website www.ba-londoneye.com now has an on-line booking facility and has also gained a reputation for being very informative and easy to use.

For media enquiries, please contact Kelly Matthews/ Kirsty Bowles/ Annabel Gunnell on 0870 220 2777 or British Airways press office on 0208 738 5100. For enquiries about our website and picture usage, please contact Karen Henry on 0870 990 8881 ext 2417. For other marketing enquiries, please contact Karen or Jo Berrington on 0870 990 8881 ext 2417/2414.

A wide variety of photographs of the London Eye are available from Newscast on www.newscast.co.uk but, if you do not have internet access, please call 020 7608 1225 to arrange downloading the images. A further selection of pictures are available from Kirsten Davidson at Seven Worldwide on 0207 861 7777 or at kdavidson@sevenww.co.uk

Library broadcast footage is available from Julia Bryan at MediaLink on 020 7554 2740 or Sarah Chappell on 020 7554 2739. Archive footage is also available from Dee Brady at British Airways on 020 8738 5182.

Other useful numbers include:

Automated booking line (up to 24 tickets)	Tel: 0870 5000 600 (24 hour)
Gift voucher hotline	Tel: 0870 444 5544 (8.30am - 6.30pm daily)
Group booking line	Tel: 0870 990 8886 (8.30am - 6.30pm daily)

(For 25+ tickets, school bookings and coach parking permit reservations)

Disabled booking line	Tel: 0870 990 8885 (8.30am - 6.30pm daily)
Private capsule hire	Tel: 0870 220 2223 (9.30am - 5.30pm week) Fax: 0870 990 8882
Email: capsules@ba-londoneye.com	
Customer services	Tel: 0870 990 8883 (8.30am - 6.30pm daily) Fax: 0870 990 8884
Email: customer.services@ba-londoneye.com	
Weddings enquiries	Tel: 0870 220 2223 Fax: 0870 990 8882 Email: weddings@ba-londoneye.com
Corporate events	Tel: 0870 220 2223 Fax: 0870 990 8882 Email: corporate.event@ba-londoneye.com

Our postal address is British Airways London Eye, Riverside Building, County Hall, Westminster Bridge Road, London, SE1 7PB.