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**PROJECT TORPEDALO**

THE PEDAL-POWERED TRANS-ATLANTIC CHARITY CHALLENGE

MARK BYASS  
MIKE SAYER



## PROJECT SYNOPSIS

- Two enthusiastic engineers will attempt to cross the Atlantic Ocean in a pedal-powered boat, to raise money for charity.
- The Atlantic has only been crossed by pedal-boat twice before, with a pairs record journey time of 111 days.
- The target duration of the 3000 mile, unassisted Atlantic crossing is only 38 days – as such, the crossing will be an attempt on a World Record, not just for a pedal-boat but for any human-powered pairs crossing.
- Target sponsorship is £250,000, to be split between the Motor Neurone Disease Association and Make-A-Wish Foundation® UK.
- The boat has been designed by the two engineers, and is completely bespoke. It is entirely self-sufficient, with onboard electricity generation and water production.
- Manufacture of the boat takes place over the first half of 2011, through a consortium of sponsoring companies.
- A comprehensive programme of exhibitions, events and sponsor promotions is confirmed for 2011, including the two largest boat shows and the biggest motor show in Europe.
- A TV documentary about the project is being filmed, recording all aspects of the challenge.
- Major partners are now sought to support the fundraising effort through sponsorship.
- More detail about every aspect of the project is included in the following pages.

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## INTRODUCTION



Mike Sayer



Mark Byass

**Mark Byass (Design Modeller) and Mike Sayer (Technical Assistant to Engineering Director) are both keen charity fundraisers. Over the past years, both have undertaken physical challenges in order to raise money for a number of charities. While Mark has completed the 26 mile Jungfrau Marathon twice, and run as part of a team from Crewe to the Brooklands racetrack in Surrey, Mike has completed 10 kilometre swims and cycled 350 miles from Crewe to Le Mans, all in aid of charity fundraising.**

Since completing their most recent and separate charity challenges, Mark and Mike decided to form a team to allow them to determine and complete a charity fundraising event of much greater depth and difficulty than either of them have attempted before.

The requirements of the challenge were:

- To be based around extreme sustained physical exertion that will require complete dedication and very high levels of mental and physical strength.
- To be an exciting, new idea that will excite potential sponsors to allow the maximum amount of money to be raised.
- To involve an environmentally friendly, sustainable message.
- To have the potential to set or break at least one world record.
- To attempt something that very few people have tried before.

With these targets in mind, a challenge was agreed that will test the pair to their personal limits and beyond. The result has been christened Project Torpedalo, and will test the skills of the team not just during the event, but over the predicted 28 month lifespan of the project. Engineering analysis, model making and testing, full design work, manufacturing skills, project management, fundraising, PR and marketing work will all be involved to a level that neither team member has experienced before. Determination and commitment will be required in equal measure to overcome whatever problems are encountered, with the unwavering goal of completing the challenge.

**“ONLY BY SETTING OUR SIGHTS ON  
DISTANT AND DIFFICULT GOALS DO  
WE TRULY SUCCEED.”**





## THE CHALLENGE

After consideration of a number of possibilities, the following challenge has been agreed:

- The team are designing, from scratch, a self-sufficient pedal-powered boat.
- This boat will be constructed with a net cost of £0, using sponsorship from supplier companies and design, engineering and manufacturing resources provided by Bentley Motors.
- The design of the boat has been developed using the latest modelling, simulation, testing and refinement techniques. The finished design will be constructed in carbon fibre.
- The Atlantic crossing will begin on 4<sup>th</sup> December 2011, leaving from La Gomera in the Canary Islands and arriving into Port St Charles, Barbados - 2914 miles as the crow flies. The team will not be using support of any kind during the crossing, and will be entirely self-sufficient.
- The Atlantic crossing will be in association with Woodvale Challenge, who organise a trans-Atlantic race every two years.
- The target duration for the Atlantic crossing will be 38 days, setting a new World Record.
- The fundraising target for the project is £250,000.

This challenge represents a test of physical and mental durability unlike any other. Far fewer people have crossed the Atlantic Ocean under their own power than have climbed Mount Everest. Almost all of these people have rowed the Ocean – there has only been two previous pedal-powered crossings of the Atlantic, with the only pairs crossing taking place in 1994 and lasting 111 days. With this in mind, the intention is not just to break the pedal-boat world record but also to beat the pairs rowing record, currently standing at 40 days and six hours.

One fact is certain – Mark and Mike will not stop working or pedalling until arriving in Barbados having pedalled a boat across the Atlantic Ocean.

# CHARITIES

Mark and Mike have decided to split the fundraising monies between two charities. These charities are ones that both team members feel strongly about, with such a connection being important when dealing with the intense exertions that lie ahead.



## Charity One – Motor Neurone Disease Association

MND is a rapidly progressive, fatal disease. It attacks the nerves that send messages from the brain to the muscles, leaving people unable to walk, talk or feed themselves and eventually unable to breathe. Imagine a healthy and alert mind trapped inside a body that can't move, but can still feel. That's the devastating reality of Motor Neurone Disease (MND). Every day 5 people will die from MND and around 5,000 people in the UK are living with MND at any one time. Half of all people die within 14 months of diagnosis.

The MND Association is the only National Charity that provides care and support for people living with MND. We fund an extensive range of services including a vital equipment loan service, care and support and also a help and advice line so nobody need ever feel alone. They also fund research into this terrible disease to ultimately find a cure so that one day we can have a world free of MND.

The Association was formed in 1979 by a group of volunteers who wanted to co-ordinate support, guidance and advice for people affected by the illness. They now have 1,500 volunteers and 120-plus paid staff, all dedicated to improving the lives of people affected by MND, now and in the future.



## Charity Two – Make-A-Wish Foundation

Make-A-Wish Foundation® UK grants wishes to children and young people fighting life-threatening illnesses. Since being established in the UK in 1986, they have granted over 5,600 wishes. There are 20,000 children living in the UK with a life-threatening illness - every one of these children deserves to experience the magic of a Make-A-Wish wish. In 2009, around 1,000 children will turn to the Foundation to have their special wish granted. Make-A-Wish needs to raise £5 million a year to continue granting these magical wishes.

Make-A-Wish is affiliated to Make-A-Wish Foundation® International. It is now the largest wish granting organisation in the world and can be found in more than 30 countries on five continents.

*Motor Neurone Disease Association is a registered charity (294354)*

*Make-A-Wish is a registered charity in England and Wales (295672) and Scotland (SC037479)*

# VEHICLE SPECIFICATION

The design and specification of the boat is clearly central to the success of the project. As two people who have no experience of boat design or construction, the team has recruited a number of technical specialists and experts in various fields to assist with the decision-making process and the design of the boat.

- Boat Design and Attributes:**  
 Mr Phil Morrison, yacht designer, racer and designer of the current standard ocean rowing boat used by Woodvale Challenge.  
 Mr Simon Chalk, owner of Woodvale Challenger and celebrated ocean rower
- Hydrodynamics:**  
 Mr Alex Whatley of Falmouth Marine School  
 Prof. Martin Downie, Technology in the Marine Environment at Newcastle University  
 Dr Peter Wright, Senior Lecturer at Newcastle University  
 Mr Peter Bowes, Hydrodynamics Lab Manager at Newcastle University
- Boat Construction:**  
 Mr Jamie Fabrizio, Global Boat Works, who has built many of the currently in-use ocean rowing boats.
- Materials Use and Analysis:**  
 Mr Tim Searle, Head of Composite Innovations Ltd  
 Mr Antony Dodworth, Principal Research Manager at Bentley Motors  
 Mr Lee Bateup, Technologies Specialist at Bentley Motors
- Ergonomics and Packaging:**  
 Mr Jim Shaw, Head of Concepts at Bentley Motors
- Life on the Atlantic Ocean:**  
 Mrs Debra Searle, who completed a solo rowing crossing in 2001.  
 Ms Roz Savage, who completed a solo rowing crossing in 2005 and is now a professional ocean rower.  
 Mr Jason Lewis, one of the crew of the only previous trans-Atlantic pedalo in 1994.

Mark is leading design of the boat, and the input from this expert team is allowing him to create a boat design that is stable, low drag, light, self-righting, strong and durable.

<b>Boat Configuration</b>	Closed-cockpit self-righting monohull with open forward deck area and sleeping compartment to rear
<b>Approximate Dimensions</b>	Bow-to-stern: 8.0 metres Beam: 1.5 metres Height: 1.5 metres (excluding keel and propeller)
<b>Construction</b>	Two-skin carbon fibre hull with foam core and carbon ribs Sprayed CopperCoat copper-metallic layer beneath waterline Carbon fibre superstructure 4x Lewmar ocean hatches
<b>Powertrain</b>	Single one-gear pedal crankset Gates belt drive power transmission system Custom Bruntons twin-blade low speed propeller
<b>Electrical System</b>	Power provided by two arrays of Sharp solar panels Onboard water desalination system (via reverse osmosis) with 30 litres/hour installed capacity from Schenker 30 system. 2x Mastervolt AGM85 Gel batteries Raymarine A50D GPS navigation system Icom M-505 VHF radio Iridium 9522-P satellite phone Raymarine AIS500 radar transceiver Lopolight LED cabin, cockpit and exterior lighting Moveable video recording system
<b>Self-righting</b>	Full self-righting capability without external intervention. Ability to self-right when fully loaded, empty or any intermediate state
<b>Target Performance</b>	Comfortable average cruise: 3 knots High speed cruise: 4 knots Maximum self-propelled speed: 7 knots Maximum design boat speed: 15 knots
<b>Duration Capability</b>	Food storage capacity: enough for 90 days Water supply through onboard desalination 170Ah installed battery capacity
<b>Safety Equipment</b>	Self-deploying Viking ocean life raft Emergency tracking, location and homing beacon Separate Icom M-71 emergency radio Manual Katadyn water desalinator Full flares kit Fire suppression equipment Fiorentino Para Anchor and sea drogues

## DESIGN AND TEST

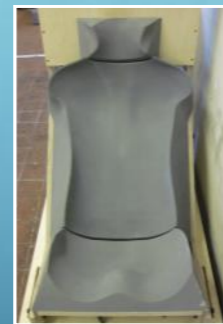
Design work began in January 2010, with the aim being to complete major exterior and interior design by the end of 2010. This has been achieved, with the manufacturing process beginning in January 2011 while the team complete the detail interior design. The very latest modelling, analysis, simulation and development software, supplied by Auto-desk, have been used to design the most advanced human-powered ocean-going boat in the world.

- Sponsorship from Newcastle University in the form of access to their 37-metre long towing tank has allowed the development of a hull shape that has half of the hydrodynamic resistance of the current range of ocean rowing boats, through a three-stage test program.
- Computer analysis of the roll stability of the boat is has proved that the boat self-rights if capsized.
- Both Mark and Mike have been digitally scanned, resulting in 3D CAD models of themselves that can be manipulated in to any position (standing, sleeping, pedalling etc). An anatomically and ergonomically optimised seat has been designed using this data by Torpedalo ergonomy expert Alan Ramsay.

- Digital virtual packaging models have been augmented with physical mock-ups to optimise storage space and work out how Mark and Mike will move through the boat,
- Every single piece of kit to be taken on the boat has been digitally modelled for weight and volume, allowing us to design the storage spaces around the kit and calculate centres of weight and buoyancy.
- Upper surfaces have been aerodynamically shaped through Computational Fluid Dynamics (CFD) analysis in conjunction with Exa and Bentley.
- 100 years of weather data have been analysed and averaged to determine likely wind speeds and directions, temperatures and sea states. These data have been referenced for aerodynamic and hydrodynamic attributes,
- Solar incidence calculations have allowed us to design the best possible photovoltaic electrical system, using three individual 60W solar modules to generate 600 Watt-hours per day.



Being scanned to create 3D CAD models



Ergonomic seat



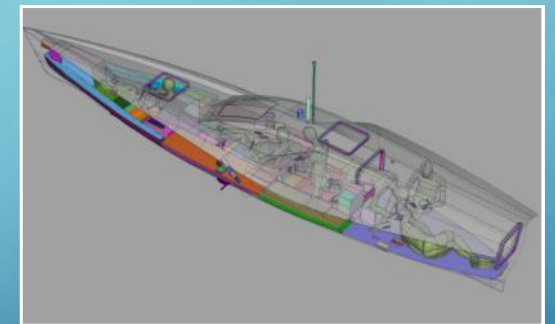
Mark and Mike meet Richard Noble



Final hydrodynamic hull model under test



The drivetrain



An early digital packaging model



# MATERIALS & MANUFACTURING

The boat will be manufactured in carbon fibre by a consortium of sponsoring companies. Cutting of the male pattern for the main hull is scheduled for January 2011 at Curvature Group, closely followed by the machining of female moulds for smaller boat components at Bentley and Cube Precision. Patterns and moulds will all be machined into M440 tooling board supplied by John Burn.

Completed moulds will then be delivered to the lead company of the consortium, Norco GRP in Poole, Dorset. Norco will take female moulds from the male pattern and then lay-up the entire boat in a mixture of biaxial and unidirectional carbon fibre, using resin supplied by Sika and carbon from Hexcel. Major sections will be a sandwich construction, with a pair of carbon fibre skins over a foam core. Once individual mouldings are complete, Norco will bond the sections together to form the completed shell of the boat using Sika marine adhesive before painting the exterior.

Delivery of the completed hull to Torpedalo HQ is scheduled for the last week of April 2011, in time for the boat to be at the Liverpool Boat Show. After the show, fitting out with the electrical system, drivetrain, windows and hatches will begin before a rigorous test programme starts in June.

### MATERIAL SUPPLY



### MOULD MACHINING



### LAYUP, BONDING AND PAINT



## MARKETING AND PUBLIC RELATIONS

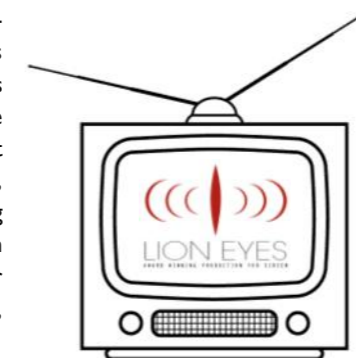
The key to the project being a fundraising success lies within the marketing strategy. Fortunately, the project has already attracted the attention of local and national press and international websites, and interest continues to grow in what is a unique and media-worthy adventure. We are also fortunate to have the promotional power of the Bentley PR and Marketing teams behind us, who are assisting with all aspects of our publicity campaign.

There are many methods and outlets that are available to the project to attract the attention of the public, and significant public exposure is vital to be able to raise money and also highlight the major sponsors of the project. The following is a list of the marketing outlets we are using:

- Press releases to the local and national media. Our first press release was a trial, sent only to automotive magazines, but resulted in widespread coverage online and even a small piece in the Daily Mirror.
- A complete project website that has been online since early 2010. The site include a micro-blog feeds from Twitter and Facebook, weekly photo updates from Flickr, video collation from YouTube, details of the boat and the project, space dedicated to all project sponsors, details of how to sponsor the project and team profiles and contact details.
- An article in the Bentley customer magazine (global circulation of 53,000).
- Exhibitions and demonstrations at the London, Liverpool and Southampton Boat Shows and the Cholmondeley Pageant of Power
- Dedicated space for the project on the Bentley Motors stand at the Geneva motor show.

The success of the marketing campaign will hopefully cause a loop of positive feedback – more exposure makes the project more attractive to sponsors, and if the number of major sponsors increases then more opportunities to highlight and market the project will be available. All of these factors will hopefully result in a great deal of sponsorship, both corporate and private, to ensure that fundraising is as successful as possible.

The most significant marketing and promotional tool available to the project is the result of a deal signed with Lion Eyes TV, based in Manchester. Lion Eyes are filming the development of the project and ultimately the Atlantic crossing itself, with the result being two hour-long documentaries - one covering the design and manufacture of the boat, sponsor meetings, training and race preparations, and one covering the race itself.



The search is on for a TV channel to commission the programmes, with approaches made to the BBC, Channel 4, Discovery and National Geographic. Lion Eyes are so confident that the production will be bought that they are investing their own money in the production of the programmes. As with live promotional events at boat and motor shows, this deal will expose the project to hundreds of thousands of people.

The project intends to emphasise several key messages during promotion, and many of these ideas are reflected in the industry-leading companies that are supporting us. The core messages that the project will involve are:

- Use of lightweight and modern materials and designs
- Sustainability and ecological thinking, through the use of environmentally friendly materials and the self-sufficiency of the boat
- Integrated modern technology – live GPS tracking, the latest solar panel technology, full datalink connections, etc

More importantly, there are two unique aspects of this project when compared to any other human-powered ocean boat endeavour:

- 1 – The boat will be pedalled, not rowed
- 2 – The boat is designed and built by the team, not bought off-the-shelf

## COME AND MEET US

From January 2011, we will be displaying the project and our sponsors at some of the world's leading boat and automotive exhibitions. Please stop by and say hello!

<p><b>TORPEDALO DRINKS RECEPTION</b> Jack Barclay, Mayfair, London. 200 guests for drinks and canapés.</p>	<p>3rd November 2010</p>
<p><b>LONDON BOAT SHOW</b> 114,000 visitors in 2010. Confirmed exhibition stand.</p>	<p>7th - 16th January 2011</p>
<p><b>GENEVA MOTOR SHOW</b> Confirmed exhibition on the Bentley Motors stand for the duration of the show. Featuring a quarter-scale boat model, promotional videos and sponsor logos, and with Mark and Mike in attendance throughout. ~800,000 visitors per year</p>	<p>4th - 14th March 2011</p>
<p><b>LIVERPOOL BOAT SHOW</b> Brand new event for 2011. Confirmed exhibition stand.</p>	<p>29th April - 8th May 2011</p>
<p><b>TORPEDALO GALA EVENING</b> Central London Combined sponsor highlight and fundraising event</p>	<p>Summer 2011</p>
<p><b>CHOLMONDELEY PAGEANT OF POWER</b> ~50,000 visitors over the weekend in 2010. Confirmed exhibition stand, with the boat in the water.</p>	<p>15th - 17th July 2011</p>
<p><b>SOUTHAMPTON BOAT SHOW 2011</b> 136,000 visitors in 2010. Confirmed exhibition stand, with the boat in the water.</p>	<p>16th - 24th September 2011</p>

## SPONSORSHIP

All equipment and materials, manufacturing resources and testing services to design and build the boat and finance to meet the Woodvale race entry fee were secured over the course of 2010. With the project in a position where all resource required to allow us to complete our challenge in place, 2011 will focus on using the project to raise our target £250,000 for charity. Corporate, private and personal sponsorship will all be sought in the effort to reach this goal.

To facilitate the search for sponsors and hopefully make agreements easier, a five tier sponsorship system has been devised. Each tier has a sponsorship value assigned to it, and the benefits and rewards for sponsors increase with each tier. The value of a sponsor's contribution determines the tier that they occupy. This structure is intended to provide a framework, but does not have to be completely rigid – every sponsorship deal can be negotiable within the framework. The sponsorship system is shown on the next page.

A range of public fundraising activities will be arranged to generate as much charity money to add to that provided by corporate sponsors as possible. This will include work with local schools and companies, project exhibitions at the major public displays and events shown opposite, and large-scale media work. A Gala Dinner and Charity Fundraising evening will also be held in central London in the summer of 2011, which will include an auction of several incredible prizes to raise money for the chosen charities. These measures should together ensure that the fundraising targets are met, meaning that over the course of the project £250,000 can be generated for charity. This can then be supplemented by a project-ending auction of equipment, potentially including the boat itself.

## PROJECT TORPEDALO SPONSORSHIP MATRIX

	PLATINUM £50,000+	GOLD £10,000 - £49,999	SILVER £1000 - £9999	BRONZE £250 - £999	MEMBERS £10 - £249
Logo on monthly project update newsletter (The Snapshot)	X	x	x	x	
Access to all released project images and media	X	x	x	x	x
Company ID with weblink on project website	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Material for use in company publications (on request, e.g. testimonies)	x	x	x	x	
Use of project name, logo and supporting materials	x	x	x	x	
Copies of post-event report and media pack	x	x	x	x	
Invitation to project highlight event	x	x	x	x	
Sponsor logo on boat	Very large	Large	Medium	Small	
200 words about company on project website	x	x	x		
Use of team members and scale model for sponsor event (UK only)	x	x	x		
Mention in press releases from Bentley, if applicable (dependant on theme of release)	x	x	x		
Logo on project exhibition stand for public appearances	x	x	x		
Official tour of Bentley factory for four people	x	x	x		
Logo on printed or electronic promotional material about the project	All	All	Posters & Brochure		
Logo on project promotional clothing (produced before departure to Canary Isles)	x	x			
Logo on project support vehicle (if used) and boat trailer	x	x			
Company details on exhibition stand for public appearances	x	x			
Brand / market sponsor exclusivity	x	x			
Use of team members and exhibition boat for sponsor event (UK only, exc. costs)	x	x			
Official tour of Bentley factory for four people inc. lunch and Bentley passenger rides	x	x			
Dedicated separate page on project website	x	x			
Mentions in interviews	x	x			
Mentions during race blog entries	x	x			
Ad hoc appearance requests	x				
Naming rights for the boat	x				
Photo opportunity on board boat in water with team	x				
Possibility of affinity partnership with Bentley Motors	x				

### Note 1 - Company ID on Project Website

- Platinum: Highlighted, title logo on opening page.
- Gold: Logo highlighted on all website pages  
Large logo in frame at bottom of all pages.
- Silver: 300px logo on dedicated page  
Logo in frame at bottom of all pages, and  
200px in sponsorship section
- Bronze: 200px logo in sponsorship section
- Member: Name in list of supporting companies

# MILESTONE TIMINGS

Hydrodynamic analysis completion	9th August 2010
Boat design freeze	1st February 2011
Public unveiling of boat	28th April 2011
Gala Evening and Charity Fundraiser	Summer 2011
Race boat launch	1st June 2011
Race boat shipping	17th October 2011
<b>RACE START</b>	<b>4th December 2011</b>

