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Capability: designs adapt to accommodate Joint Strike Fighter Page 6



News from the Aircraft Carrier Alliance Issue 6 January 2012

carrierwaves



Assembly begins

CONSTRUCTION PROGRESS

The delivery of the nation's flagships moved an important step closer recently when the massive Goliath crane swung into action for the first time, signalling the start of the assembly phase.

After months of planning and preparation the first section of Central Block 03, built by A&P Tyne and transported to Rosyth just a few weeks earlier, was secured to the crane's lifting gear.

Then, as dozens of workers looked on, Goliath gently lifted the 800 tonne section from the ground, smoothly hoisted it up and eased it into place on top of Lower Block 03, starting a new chapter in the construction of the nation's flagships.

Geoff Searle, Aircraft Carrier Alliance Programme Director, said: "Everyone involved with

"Dealing with an 800-tonne load requires total accuracy and meticulous planning"

Geoff Searle, Programme Director

the programme has been looking forward to reaching the assembly stage. Goliath in action for the first time was a massive milestone.

"But the first lift was also a really challenging operation. It was one of the heaviest in the entire programme, and dealing with an 800-tonne load requires total accuracy and meticulous planning. It was a real testament to the professionalism of everyone involved that it went successfully.

"Of course, it was just the first of many lifts Goliath will be doing, and now we are firmly in the assembly phase its capabilities are proving essential."

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Above: assembly work moves ahead at Rosyth

Rising to formidable challenge

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Work has been moving ahead to integrate all four sections of Central Block 03 and the sponsons – the extensions which widen the flight deck and give the ship the distinctive profile of an aircraft carrier.

Geoff Searle said: “The last few months have been hugely important. The first large block – an 8,000-tonne mid-hull section – was successfully moved 600 miles around the coast of Scotland, from BAE Systems’ Govan shipyard to Rosyth and installed in the dry dock.

“Since then it has been the focus

“There is a growing sense of pride and achievement”

Geoff Searle, Programme Director

of a huge amount of work, and now it’s clear that the first of the Queen Elizabeth Class aircraft carriers is really taking shape. There is a growing sense of pride and achievement across the programme that such a complex build is coming together and the plans are proving themselves.”

There are three cycles in the assembly phase. Dock Cycle A – the

assembly of LB03 and CB03 and sponsons – is due for completion next summer. Dock Cycle B involves integrating the blocks that make up the forward section of the ship and will take the programme up to spring 2013. The final dock cycle will see the rest of the blocks integrated, with the hull assembled in 2014.

Defence Equipment, Support and Technology Minister Peter Luff visited Rosyth and said: “The job of building these truly formidable carriers is a big challenge. We are very fortunate to have such a dedicated and skilled workforce able to rise to this challenge.”

Flight deck sections arrive

Before assembly could begin at Rosyth, the first sections to be integrated needed to be constructed.

The four sections of Centre Block 03 – which form part of the flight deck and hangar – were built at A&P Group’s Tyne yard, where work was completed five weeks ahead of schedule.

A&P Tyne Project Director Darren Brown said: “We complet-

“We completed the sections ahead of schedule”

Darren Brown, Project Director

ed the sections ahead of schedule and even finished the load-out in 10 days instead of 12.

“We had some challenging weather with winds gusting up to 40mph, but as soon as they dropped we cracked on and everything went exceptionally well.

“Most importantly, it was all done safely and incident free.”

The steel modules, which weighed a total of 3,000 tonnes when secured aboard the barge, were the culmination of three years work at A&P.

TEAM EFFORT

HUNDREDS EXTRA TO ROSYTH

Assembling the Queen Elizabeth Class takes a lot of highly skilled workers.

So, accompanying the arrival of the block at Babcock's Rosyth site were several hundred staff from BAE Systems in Govan, where the block was constructed.

BAE Systems project director, Steven Carroll, said: "As well as the huge assembly task there are a lot of fitting-out tasks still to be done, so we had to plan for hundreds of staff usually based in Govan to work in Rosyth.

"That in itself was a challenging project, but it's gone smoothly and is a great example of how effectively the Aircraft Carrier Alliance is performing. Work is progressing well."

By June, there will be more than 340 staff usually based on the Clyde working regularly at Rosyth.

Focused on the job

"On a clear day, the view is breathtaking," said Goliath driver David McGilvray (pictured above right). "But there is no time to admire the surroundings – heavy lifts are a team effort and everyone is 100 per cent focused on the job."



Above: heavy lifts are a team effort

News in brief

One million safe hours

The Aircraft Carrier Alliance celebrated reaching one million hours (that's more than 114 years of work!) without a reportable safety incident recently.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) is a requirement for every employer and every serious incident must be formally reported to the Health and Safety Executive.

"Safety is a top priority for the ACA," said Programme Director Geoff Searle. "Reaching one million man hours without a reportable incident is a tremendous achievement. Well done to everyone for making sure safety is something to be proud of. The next challenge is to reach the two million mark."

Trade Union agreement signed

Senior representatives from the Confederation of Shipbuilding and Engineering Unions (CSEU) met with the Aircraft Carrier Alliance to sign a partnering agreement which will frame the way the two will work together to deliver the nation's flagships.

The CSEU includes the trade unions GMB, UNITE, UCATT and Prospect, and represents thousands of workers involved in the Queen Elizabeth Class programme. Sandra O'Connor, head of HR for the ACA, said: "Working as a partnership is a key factor in creating a successful alliance and crucial to the success of this programme.

"This agreement recognises the different issues that all parties face, but most importantly it shows a commitment from everyone to deliver this historic programme to the very highest of standards. It will play a really important role."



Above: Centre Block 03 was constructed at A&P Group's Tyne yard

MISSION SYSTEMS

TECHNOLOGY TESTED IN ADVANCE OF INSTALL

Each of the two Queen Elizabeth Class ships will house more than 14,000 separate parts of Mission System equipment, covering everything from televisions for the crew's entertainment to the on-board sensors that will help defend the ships from attack.

Now engineers are installing elements of the HMS Queen Elizabeth systems into a special facility at the Royal Navy's maritime warfare school, HMS Collingwood, near Portsmouth, to ensure they perform exactly as they should on the ships themselves.

Steve Brown, Mission Systems Integration Manager, said: "Former First Sea Lord, Admiral Sir Jonathan Band, called the QE Class Mission System 'the heart, soul and brains of this beast', so properly de-risking and testing it is critical.

"Having a facility where we can link key parts of the Mission System together and test them across the real platform networks is necessary if we are to deliver the programme on time and ensure the carriers fulfil their role in the battlespace. Without the Mission System in place, the ships simply will not be able to operate."

Steve's team is responsible for developing the integrated package of tests and trials at the new HMS Collingwood facility.

Steve said: "Over the past few months, the Mission System team has been installing the network equipment for HMS Queen Elizabeth into the integration facility at HMS Collingwood. After some stand-alone tests this equipment will be used to underpin the first large-scale mission systems trials, helping to de-risk and assure some of the systems, but also giving Royal Navy Ratings and Officers a chance to use QE Class equipment for the first time."

Throughout 2012 and beyond a number of systems will be installed and tested at HMS Collingwood, including more than 250 cameras of the Visual Surveillance System and the complete Command Management System.

Steve said: "The large-scale trials are part of an extensive shore integration programme that has been running for a number of years across supplier sites and at the Mission Systems Integration Facility at Portsdown Hill in Portsmouth. All of this is a vital part of delivering the nation's flagships."



2012 is a

LOOKING AHEAD

The next 12 months are a pivotal time for the Aircraft Carrier Alliance.

The programme has left the planning stages and every major section of HMS Queen Elizabeth has now either been built or is under construction, with work also well under way on the first sections of her sister ship, HMS Prince of Wales.

Aircraft Carrier Alliance Shipbuild Director, David Goodfellow, said: "Seven major sections of HMS Queen Elizabeth are scheduled for delivery to Rosyth throughout the year, and a large part of the ship's flight deck and associated sponsons are also due to be integrated.

"Complex operations, including moving

"Each ship is composed of almost 13 million parts in about 700,000 pieces of equipment"

David Downs, ACA Engineering Director

significant sections in and out of the dock are scheduled. So Goliath is going to be kept busy, as is everyone involved with the programme at Rosyth and across the country."

This year will see work continue on a number of significant parts of the ship. This includes

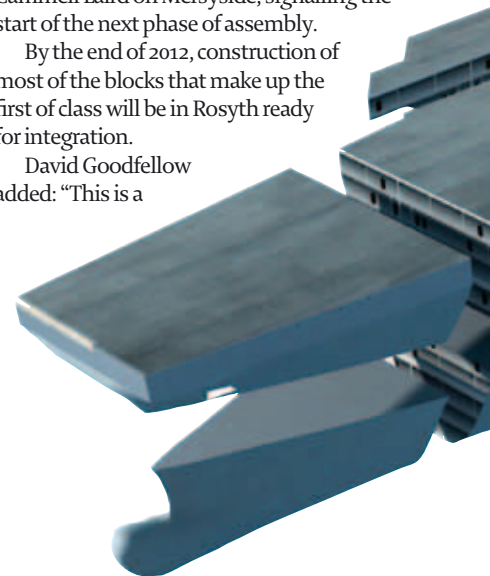


Lower Block 03 at Rosyth, the ship navigation island and Lower Block 05 at Portsmouth, the air traffic control island at Glasgow and Centre Block 04 at Merseyside.

In May this year the next major section of the hull, Lower Block 2, will make the transit up the North Sea from Portsmouth to Rosyth, together with the associated Centre Block sections from Cammell Laird on Mersyside, signalling the start of the next phase of assembly.

By the end of 2012, construction of most of the blocks that make up the first of class will be in Rosyth ready for integration.

David Goodfellow added: "This is a



testing time, but across the Aircraft Carrier Alliance we have the skills and capabilities to meet the demands placed on us and we are continually finding ways to drive cost savings.

"We also have an enviable record when it comes to safety. Celebrating one million man-hours without a reportable incident recently was a huge achievement for any project, let alone one on this scale."

But it's not all about constructing the ships. What sets the Queen Elizabeth Class apart from other vessels is not just size, but complexity.

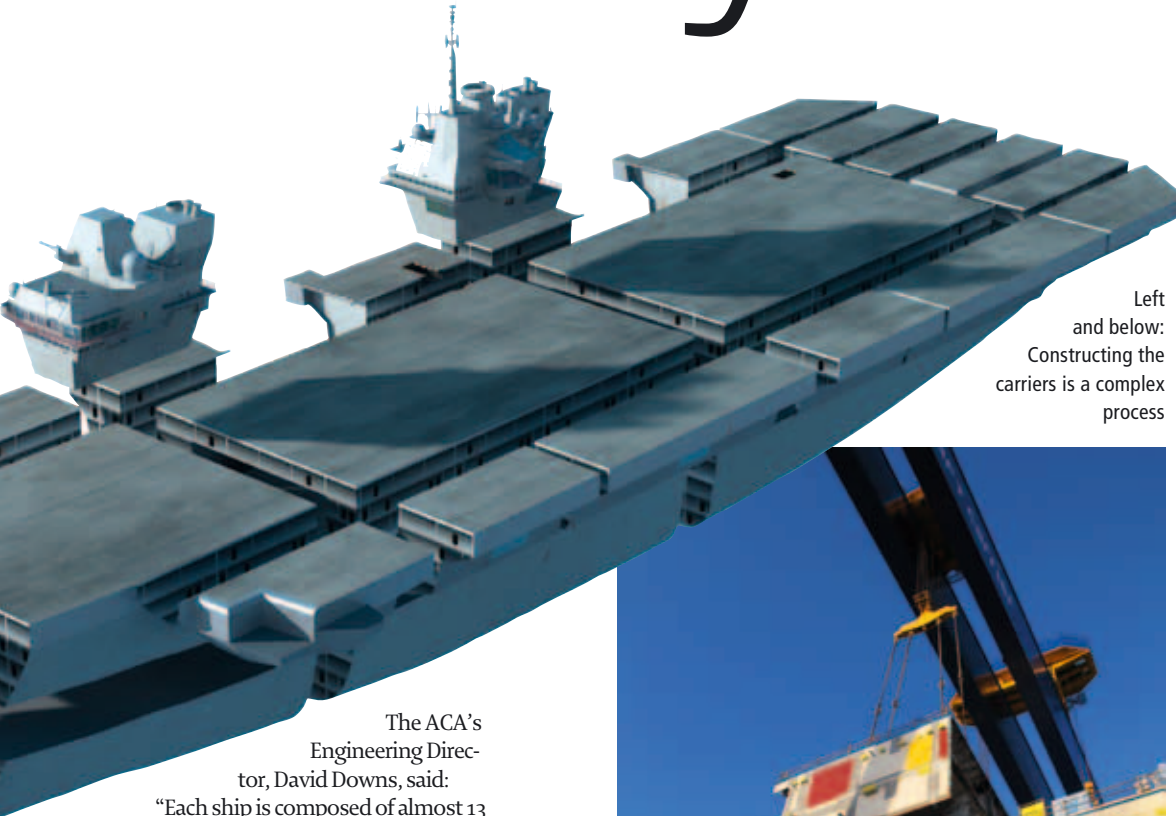
SHIP TWO - HMS PRINCE OF WALES

HMS Prince of Wales is also going to be the focus of a lot of work throughout 2012.

Manufacturing work on HMS Prince of Wales' Lower Block 03 and the bulbous bow section has already begun, and this year will see work begin on another five major sections of the ship. Programme

Director, Geoff Searle, said: "By 2013 we will be working on five major blocks of HMS Prince of Wales at sites across the UK. We've already proved the capability of the alliance and will be aiming to repeat the efforts which have gone into the first of class and learn from our experiences."

crucial year



Left and below: Constructing the carriers is a complex process

The ACA's Engineering Director, David Downs, said: "Each ship is composed of almost 13 million parts in about 700,000 pieces of equipment. A huge number of these are particularly complex or highly sensitive. Integrating them is a significant task, which is why simulations at Warton and testing facilities at HMS Collingwood are crucial.

"We are not just creating ships which will carry hundreds of crew, but also two state-of-the-art platforms which will play a central role in shaping our nation's defence strategy and providing humanitarian aid globally for decades to come."



News in brief

Carriers a work of art



The QE Class is a historic programme for the Royal Navy, for shipbuilding and for the country as a whole.

To help record the process for posterity the ACA is granting access to accomplished Scottish artist Lachlan Goudie, who will produce a number of paintings of the aircraft carriers as they are constructed.

His work can be seen at www.lachlangoudie.com

New Client Director

Captain Paul Casson RN is a Marine Engineering Officer whose recent appointments have included Cdr (E) in HMS Invincible, roles in the Main Building Capability area, and in the British Embassy in Washington. He joins the ACA from a year on the staff of the NATO headquarters in Kabul, Afghanistan.

Captain Casson said: "There couldn't be a more exciting time to join the single biggest programme in the country."





The first UK F-35 rolls out of the factory (pic: Lockheed Martin)

Making the changes

CV UPDATE

Building the carriers so they can operate the carrier variant Joint Strike Fighter F-35C will mean the UK has increased interoperability with other Allied Forces, but it also requires several design changes.

One critical area that is being looked at is the position and design of Landing Signals Officers (LSOs). These naval aviators are specially trained to facilitate safe and efficient movement of aircraft aboard the carriers and they play a key role in keeping operational tempo high.

To properly prepare this role the Carrier Variant (CV) Operability Team, led by John Ward, Project Director at Thales, spent 10 days at the US Navy's LSO School in Oceana where they received an intensive briefing on the art of controlling and monitoring an aircraft safely down to the deck.

Accommodating the Joint Strike Fighter F-35C will require alterations to the carrier design

"Simulation is one way to analyse design changes and mitigate risks at an early stage"

John Ward, CV Project Director

John Ward, said: "It was a hugely informative week culminating in some key design decisions. After much discussion and several detailed simulations it was decided to position the LSO platform in the same position in relation to the

hook touchdown point as it is on the US Nimitz class ships.

"Although this will require some additional changes to the flight deck, as well as the installation of a custom-designed LSO Display System, this option was deemed the safest, most practical and, operationally, the most realistic."

The team has also been looking at how simulations can help CV design with the help of pilots Jamie Harms and Dave Ritchie from the Aviation Directorate and the BAE Systems flight simulator at Warton.

John Ward said: "Simulation is one way to analyse design changes and mitigate risks at an early stage. We've been looking at how the simulator at Warton can help us with specific design challenges such as an operational analysis of the LSO position, FLYCO operability and solution acceptance/trials design.

Pilot Jamie Harms said: "It was really useful to experience cat and trap type approaches. It has allowed us to understand the complexities of the flying task and the subtleties of operating in challenging conditions.

"Even in an F-35C it is a challenge to land on a moving aircraft carrier when you are doing 175 miles an hour and aiming for a four-inch piece of wire. We are now in a much better position to support the team over the next 18 months."

Specifications

Joint Strike Fighter F-35C

The F-35C will operate from the Queen Elizabeth Class using a launch system to get the aircraft into the skies and arrested recovery equipment to get them back on board safely. Larger wings and control surfaces and the addition of wingtip ailerons allow the F-35C pilot to control the airplane with precision during carrier approaches. The aircraft has large landing gear and a strong internal structure to withstand the forces of carrier launches and recoveries.

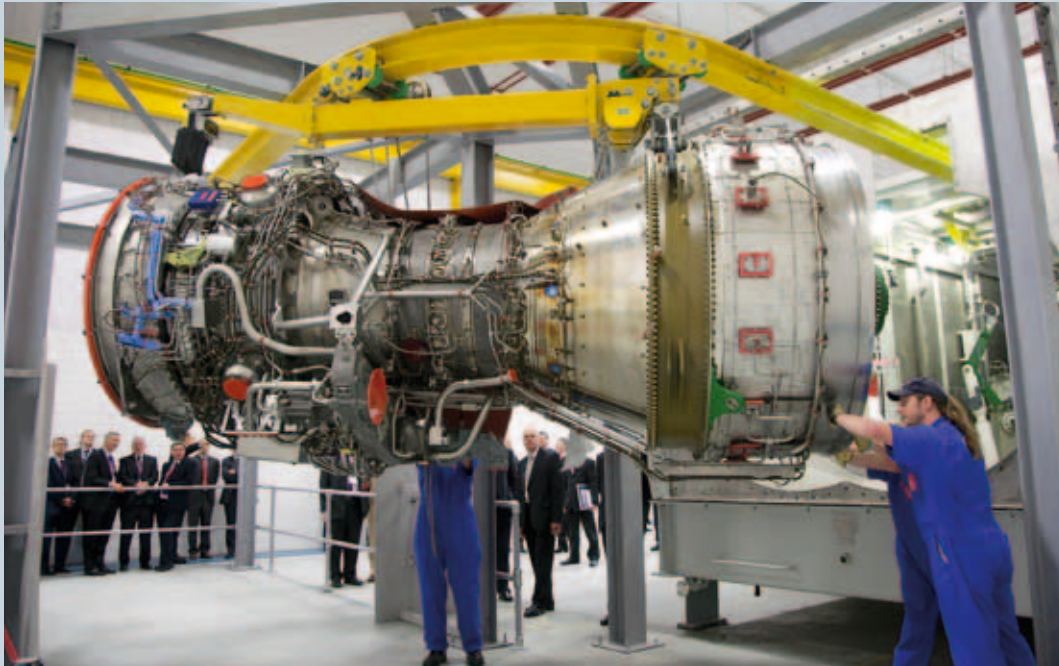


Length	15.7m
Speed	Mach 1.6
Wingspan	13.11m
Wing area	62m ²
Combat radius (internal fuel)	>640nm
Range	>1,200nm
Internal fuel capacity	19,750lb
Max g-rating	7.5
Weapons payload	18,000lb



Landing on HMS Prince of Wales in the Warton simulator

A powerful role to play



SUB-ALLIANCE

The Power and Propulsion Sub-Alliance, led by Thales on behalf of the ACA and including Rolls-Royce, Converteam and L-3, marked its third year of operation recently.

But there was no time for celebrations, as the complex work on developing and integrating the ship's power and propulsion systems continues to gather pace.

Sub-Alliance Director Jim Bennett said: "We are responsible for some of the largest and heaviest items on board, so from a construction point of view it is absolutely essential that the Sub-Alliance delivers on time. Three years on since our formation, we are very proud to have not missed a single shipyard delivery date."

At about 200 tonnes each, the four Wärtsilä diesel generators now installed represent the largest ever fitted in any Royal Navy vessel. Combined with the two Rolls-Royce MT30 Gas Turbines, all driving Converteam alternators, the ship will be capable of generating 110 megawatts – the equivalent of 230 Formula One cars!

The L-3 supplied Integrated Platform Management System (IPMS) controls and monitors all the power generated, along with over 40 other systems. Strung together



"We are proud to have not missed a single shipyard delivery date"

Jim Bennett, Sub-Alliance Director

with more than 170 miles of cabling, it interfaces with everything from Gas Turbine Alternators to ships cameras, making IPMS on the Queen Elizabeth Class the largest, most integrated, automation system on any Royal Navy vessel.

Rolls-Royce has delivered 94 per cent of the low voltage equipment and the rudders and steering hull inserts for HMS Queen Elizabeth, as well as the stabilizers for HMS Prince Of Wales.

The company has 210 tonnes of shaftlines and giant propellers at 6.7m high almost ready for delivery.

All four Converteam propulsion

motors, weighing in at 110 tonnes each, have been installed. Converteam has also delivered the other major pieces of equipment crucial to Queen Elizabeth's propulsion and high-voltage system.

Jim Bennett said: "The recently delivered rudders and steering gear hull inserts were delivered via a 'rudder alliance' between Rolls-Royce and Babcock and are a great example of successful partnerships de-risking complex solutions.

"Behind these successes is a group of highly skilled people from across the sub-alliance, working tirelessly with their colleagues across the Aircraft Carrier Alliance.

"With most equipment for Queen Elizabeth now delivered, the sub alliance must switch its attention to development of the Platform Management Systems that will monitor and control the ship's machinery that powers these mighty vessels through the water."

News in brief

Safety conference

More than 140 delegates from across the ACA attended this year's Safety, Health and Environment (SHE) conference.



It was an opportunity to share best practice and new safety improvements. But the highlight was Jason Anker's presentation. When he was 24, Jason fell from a ladder at work and was paralysed from the waist down. His frank presentation starkly highlighted the impact his accident had on his life, and how simple it might have been to avoid it.

The ACA is proud to welcome Jason as their first 'Safety Ambassador'. He will be giving a series of talks across the ACA throughout the year.

Taking stock for award

The ACA, in partnership with Wincanton's Defence business, won a top gong in the European Supply Chain Excellence Awards.

The award was presented for the measurable benefits they delivered to the programme through innovative supply chain practices.

Together, the ACA and Wincanton organised a centralised logistics solution which is operating well under budget, delivering savings of more than £1 million. They also found new ways to consolidate deliveries and handled more than six million items with a stock accuracy of more than 99 per cent.



News in brief

New Alliance Charter

Since it was formed in 2008, the ACA has become a great example of how organisations with different cultures can work towards a common goal.

The way the ACA operates is underpinned by a charter, drawn up with all the members, to define best practice.

Since the charter was first agreed, there have been a number of changes at senior management in each alliance member, so at the last management board meeting representatives from each member of the ACA re-signed the charter, reaffirming their commitment to the alliance and to delivering the nation's flagships.

Website update

Thousands of people visit the award-winning ACA website every month to find out more about the programme. Now the site is being given a refresh and a new look to keep it up to date with the work going on across the ACA.

ACA Communications Manager, John Fyall, said: "With the start of assembly the programme has entered a new phase. There is a huge amount of work going on all over the country. The new-look website will retain all the great functions of the current one, and it'll be easy to get straight to the information that people want to see, such as pictures and videos of the build."

www.aircraftcarrieralliance.co.uk



Event Organiser Kirsty Noble was presented with a special commendation for the team. Below: Liz Ridgeway from the Royal Navy and Royal Marines Charity receives a cheque for £35,000 from Geoff Searle on behalf of the ACA

They beat the block – and smashed their target!



As Lower Block 03 set off from Govan, so did a group of intrepid Aircraft Carrier Alliance employees, all determined to 'beat the block' by bike, as it travelled around Scotland by sea.

The gruelling 500-mile cycle took them from BAE Systems' Govan shipyard to Babcock's facility in Rosyth.

Event organiser, Kirsty Noble, said: "Forty cyclists braved the full five day route, with a further 35 taking part in shorter sections along the way. We were hoping to raise as much as £10,000 for the ACA's partner charity, the Royal Navy and Royal Marines Charity, but we've



smashed our target and raised more than £35,000!"

Kirsty added: "Some days the group covered more than 120 miles



and although the scenery was stunning, the hills were brutal! They battled on despite bike failures, torrential rain and the ubiquitous Scottish midge!"

The event was such a success that organisers were presented with a special commendation by HRH The Princess Royal, Patron of the Royal Navy and Royal Marines Charity.

"It was a real surprise to be invited to meet the Princess," said Kirsty. "But an honour to represent everyone who took part in the event and made it such a success."

"It was a surprise to be invited to meet the princess"

Kirsty Noble, Event Organiser

