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News from  
the Aircraft  
Carrier  
Alliance  
Issue 9  
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# carrierwaves



## HMS Queen Elizabeth takes a dignified bow

### PROGRESS

Aircraft Carrier Alliance workers have successfully attached the final bow unit to the carrier HMS Queen Elizabeth, completing assembly work on the forward part of the ship's hull.

Speaking as the section was lifted into place, Programme

### Assembly work on carrier's hull is now complete

Director Ian Booth said: "It's another milestone reached and another reason to take pride in this historic programme."

HMS Queen Elizabeth now stands at more than two-thirds assembled. Over the next few months work will continue to prepare the ship, ready for her launch next year, followed by final fitting out and setting to work before sea trials.

Minister for Defence Equipment, Support and Technology Philip Dunne said: "HMS Queen Elizabeth is an enormously impressive sight.

With her bow now attached she is visibly taking on the appearance of the immensely powerful aircraft carrier she will be when she enters service.

We hope to see the ship structurally completed later this year, ready for her launch next year followed by her final equipping and fitting out for sea trials, which we expect in 2017."

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**Test flights are 1,000 up**

The F35B has completed 1,000 test flights as part of the aircraft's system development and demonstration phase.

The most recent flight saw the aircraft perform a short take off and vertical landing (STOVL) operation at a test area in Maryland. The landmark mission was flown by a US Marine Corps pilot.



**A sense of scale**

**IN FOCUS**

What will the Queen Elizabeth Class look like when they are fully assembled?

The Aircraft Carrier Alliance has developed a new set of images which reveal how the carriers will compare to a series of UK landmarks.

At 280 metres (918 ft) long the carrier is 15 metres longer than the Palace of Westminster, three times



longer than Buckingham Palace and five times the length of the Angel of the North.



These posters are available to download at Flickr.com (search for 'QEClassCarriers').

**Breathing Life into HMS Queen Elizabeth**

**INTERVIEW**

By the end of this year, the first of the UK's new aircraft carriers will be structurally complete. However, the work doesn't stop there.



Steve Dowdell is in charge of the team delivering the Mission Systems for the QE Class, and it's their work that will begin to take centre stage as the programme moves from constructing the vessel to creating the capability.

**Describe your job**

As the Mission System Director it's my job to bring together equipment ranging from small software packages to the ships' radars. All these systems have to be integrated together into the ship and into operation with the end user, the Royal Navy.

**Explain what Missions Systems are in one sentence**

The First Sea Lord very eloquently described the Mission System as "the heart and brains of the Carrier".



Testing Mission Systems comms equipment

**What are your biggest challenges?**

This is a really complex programme, with over 50,000 installed parts in over 1000 compartments. But my key goal is to ensure that all the people, as well as all the equipment, pull together and work in the same direction.

**Why are Mission Systems so important?**

The Mission System turns the ship into a fully-fledged warship, allows her to be sailed out of port, to be navigated safely, to bring aircraft on-board and to plan and execute missions.

We also provide health and recreation services on board. This is incredibly important to the welfare of the crew; after all they will be serving on board for extended periods of time.

**How many people are in your team?**

About 150 people, and several hundred more in the supply chain. We are based at sites across the UK.

**Technology develops so rapidly – what are you doing to 'future-proof' the Mission Systems?**

We have designed the infrastructure

so we can reach all parts of the ship to add or change equipment in the future without having to install lots of new kit. The fibre optic cables we are installing are central to this.

**How different is this job to others you have had?**

We work hand in glove with the Royal Navy on this job, which is very different to other UK projects and every day I see the benefits of working as a unified, single team.

I can genuinely say that it's a pleasure and a privilege to be working each day on a flagship project for a world-class Navy.

**Gandhi star visits Rosyth**

Sir Ben Kingsley paid a visit to Babcock's Rosyth dockyard – and surprised some of the workers building HMS Queen Elizabeth.

The Oscar-winning actor, famous for his roles in Gandhi and Schindler's List, was visiting to learn more about the site's history, but was also given a guided tour of the aircraft carrier under construction.

Alex Keatings, Heavy Handling Engineer, said: "I did a double take when I saw him. The last

person you expect to meet on a cold Monday morning in Rosyth is a Hollywood star!"

**"The last person you expect to meet on a cold Monday morning in Rosyth is a Hollywood star!"**

Alex Keatings, Heavy Handling Engineer



Above: Sir Ben Kingsley surprises Rosyth workers



# Island life

IN DETAIL

The design of the Queen Elizabeth Class ships is unique.

Unlike any other aircraft carrier operational today, they will each feature two 'islands'. Towering over the flight deck these massive sections will provide independent control of the ships' navigation and the aircraft operations.

## Queen Elizabeth Class ships really are like no other with their two control islands

Standing six decks high and weighing around 700 tonnes, each island also acts as intake and outtake for the gas turbines in the ship below.

Engineering Director David Downs explained: "Having two separate islands gives the Queen Elizabeth Class a high level of flexibility, survivability and capability."

"The location of the gas turbines meant that having two islands was always an option, and as the design progressed it became clear that this was the right direction to take."

"The captain will have a dedicated bridge to control the movements of the

ship, and the air traffic controllers will have a dedicated control tower from where they will oversee all the air traffic on-board. Each is positioned perfectly to allow for the best visibility of their respective operations."

"What's more, this innovative design means that should either of the islands require repairs, the ship can be operated from the other, making them among the most flexible carriers on the seas."

## Section delivered to assembly site

The iconic forward island of HMS Queen Elizabeth has completed the 600-mile journey from Portsmouth to the assembly site in Fife.

Project manager Paul Bowsher said: "It's been a real honour to work on this particular section. Teams at BAE Systems, Portsmouth, took just 70 weeks to construct the island which, at 600 tonnes, and containing 100 com-

partments, was bigger and more complex than many entire vessels."

A specialist transportation team coordinated the section's 600-mile journey along the east coast of the UK to Rosyth. Bobby Thompson from the ACA's transportation team said: "We've coordinated the movement of thousands of tonnes of HMS Queen Elizabeth with the help of specialist contractors includ-

ing ALE and Henry Abram, but each has had its own challenges."

"The forward island is an irregular shape, so manoeuvring it on and off the barge was a carefully planned event."

The next step will see the heavy lift teams hoist the island into place on the flight deck. Follow their progress online or see the next issue of *Carrier Waves*.

Island facts and figures stats

**GOLIATH** The island comes fitted with a specially designed lifting frame which will allow the Goliath crane to lift it into place.

**VISIBILITY** The Navigation Bridge is positioned on four deck. Its floor to ceiling windows, which are two metres tall, ensure a level of visibility far beyond previous aircraft carriers.

There are 37 windows each over 40mm thick and weighing eight tonnes in total.

The observation bridge is positioned one deck below.

**SOUND** The fog horn will be installed on six deck. At 146 decibels, it is louder than a rock concert and can be heard over two miles away.

**RADAR** The Long Range Radar will be installed at the very top of the forward island. It will be able to track 1000 targets up to 250 miles away.

The navigation radars are located one deck further down, directly above the navigation bridge.

**ENGINE** The three engine exhausts are up to 2.6 metres in diameter and are located at the top of the forward island to expel exhaust from the diesel generator and gas turbines at the carrier's highest point.



"Each is positioned perfectly to allow for the best visibility of their respective operations"

David Downs, Engineering Director



Forward island leaves Portsmouth



How the lifting frame will work



The A&P Tyne team pauses for a photo

# HMS Prince of Wales makes the cut



The first steel is cut for the flight-deck

## TEAMWORK

The first steel cut for HMS Prince of Wales' flight-deck section CBo3 was made by Nathan Phelan, the youngest apprentice at A&P Tyne, where the sections are under construction.

When complete, the section will be 65m long and 40m wide. An 18-month build schedule will see it delivered in four 'rings', which will be connected to the hull to create a large part of HMS Prince of Wales' hanger deck.

Soon after, at BAE Systems Portsmouth, 21-year-old apprentice Shaun Collins saw work get under way on the forward flight deck



Apprentice Shaun Collins

section CBo2. Shipbuild Director David Goodfellow said: "The teamwork across the Aircraft Carrier Alliance to get to this stage has been tremendous. We are at a critical stage in the assembly of HMS

Queen Elizabeth, but we are also co-ordinating the construction of most of the major sections of HMS Prince of Wales. It's a real achievement to ensure both programmes are running so smoothly."

## First of two gas turbine alternators installed

In a delicate operation, Aircraft Carrier Alliance teams fitted HMS Queen Elizabeth with her first marine gas turbine.

Shrink-wrapped to keep it protected, the powerful engine was precisely lifted into place by Goliath.

The Rolls-Royce MT30 turbine – considered the world's most powerful marine gas turbine – is the first of two which will be installed on the ship.

Integrated as part of a gas turbine alternator (GTA), the power generated by the MT30s will supply the propulsion motors, weapons and navigation systems, as well as the entire low-voltage requirements for lighting and power sockets.

The GTA weighs in at 120 tonnes and includes an alternator and gas turbine enclosure.



The turbine was lifted by Goliath

## A home from home

Life on board a ship can mean long periods away from friends and family and limited home comforts.

But the Queen Elizabeth Class will be different, with each ship offering unparalleled accommodation, health, medical and recreational facilities. And a custom-built

on-board Application System will do everything from storing records to ordering supplies – even providing web access for the crew, helping them keep in touch with loved ones.

James Yates, QEC Computing Infrastructure lead, said: "The Application System is in part already

in use throughout the Royal Navy. However, we are making specific changes for the Queen Elizabeth Class. The system will be approximately 10 times the size of that installed on a Type 45 destroyer."

The system will provide all the recreation areas, and some cabins, with their own web access. Crew will be able to keep in touch with events at home while at sea.



The system is 10 times that on a Type 45

## News in brief



## Major move

Teams in Govan marked another milestone in the build progression of HMS Prince of Wales, with the successful move of ring L from bay three to bay two of the ship build outfit hall. The 1200 tonne ring was moved into position using a specialist transporter in just a couple of hours.



## On-board meeting

More than 100 senior ACA staff from across the UK met to plan the direction of the Queen Elizabeth Class programme.

And instead of a hotel or a conference centre, they met on-board HMS Queen Elizabeth itself.

Programme director, Ian Booth, said: "The advanced state of HMS Queen Elizabeth meant we were able to bring people on-board for this important event."



Adam Lydford looks forward to more MOD staff joining the programme

DE&S staff join teams working on HMS Queen Elizabeth

# MOD comes to Rosyth

## ASSEMBLY PROGRAMME

As HMS Queen Elizabeth's assembly programme forges ahead, Babcock's Rosyth dockyard is becoming a busy place.

The latest to join the thousands of BAE, Thales, Babcock and Royal Navy staff already in Rosyth are members of the Ministry of Defence's Defence Equipment and Support (DE&S) organisation.

They are also joining ACA teams in Govan and Portsmouth and bringing with them skills and experience crucial to completing the assembly of the ship and getting the first of class ready for sea trials in 2017. "These people have played key roles in the most recent

warship procurement projects and have experience stretching back to the early days of the Type 23 build programme," said Client Deputy Head and ACA Head of Acceptance Adam Lydford.

"I'll be delighted to welcome them to the team. There's a lot of work to accomplish!"

## "These people have played key roles in recent warship procurement projects"

Adam Lydford MBE, Client Deputy Head and ACA Head of Acceptance

30,000 tonnes of ship slides into place

# Skidding into 2013

## INNOVATION

There was precious little time for some of the ACA to enjoy their leftover turkey this Christmas. On December 28 and 29 teams in Rosyth conducted one of the programme's biggest engineering efforts to date – skidding more than 30,000 tonnes of HMS Queen Elizabeth into place.

Assembly Director, Stuart Leonard said: "We needed to

move the fore section of HMS Queen Elizabeth back by 17 metres so we could join it up with the rest of the hull.

"At more than 30,000 tonnes this was a huge operation. By doing it over the festive break when most people were enjoying the holidays we were able to keep the programme moving and avoid any additional stoppages."

The two sections came together and work continues on the integration process.

**"At more than 30,000 tonnes this was a huge operation"**

Stuart Leonard, Assembly Director



Watching the sections come together



## Carriers online

Thousands of people keep a close eye on the work to create the Royal Navy's flagships, despite being hundreds or even thousands of miles away!



A dedicated YouTube channel, a Flickr photostream, a Twitter news feed and an award-winning website are together giving unprecedented access to the progress being made by the Aircraft Carrier Alliance.

Hundreds of photographs and scores of videos show just what it takes to produce a new class of warship.

To follow the programme yourself, search for 'QEClass-Carriers' on Flickr, Twitter and You Tube, or visit [aircraftcarrieralliance.co.uk](http://aircraftcarrieralliance.co.uk) for all the links.

