

# THE PERFECT PARTNERSHIP



MAI is playing an important role in the development of the Royal Navy's new Queen Elizabeth Class aircraft carrier. We caught up with test pilot **Pete Kosogorin** ahead of the official naming ceremony for HMS Queen Elizabeth to get the inside track on the work that is taking place to integrate F-35 with the new carrier

**"I'VE LANDED ON THE QUEEN ELIZABETH MANY, MANY TIMES IN THE SIMULATOR AT WARTON, SO IN MANY RESPECTS, IT FELT LIKE A FAMILIAR ENVIRONMENT"**

**P**ete Kosogorin quivers with excitement as he pictures himself at the controls of an F-35 Lightning II, hurtling down the vast expanse of grey runway stretching out before him.

This is the first time he has set foot on the flight deck of the Royal Navy's magnificent new aircraft carrier, HMS Queen Elizabeth.

But as his brain struggles to comprehend the sheer scale of

the 65,000-tonne vessel rising majestically out of the ground beneath him, the 45-year-old is gripped by a sense of déjà vu.

Pete has never previously clapped eyes on the first of the UK's new super carriers, but,

thanks to the work he has done with BAE Systems' Simulation Team at Warton, he already feels like he knows every square centimetre of her 280 metres-long flight deck in intimate detail.

"It was really exciting to see the carrier for the first time," says Pete, an experimental test pilot on the F-35B programme, after taking a guided tour during a recent visit to Rosyth shipyard. "I've landed on the Queen

Elizabeth many, many times in the simulator at Warton, so in many respects, it felt like a familiar environment.

"But obviously that was in an aircraft; it's different once you actually stand on the flight deck.

"The thing that struck me, and I imagine it's the same with most people who see the carrier for the first time, was the sheer size of it.

"Everything about it is just vast and I couldn't believe

how wide it was – that really surprised me.

"I have to say I'm really excited by it and if I'm lucky enough to get involved in the

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flight tests from the ship, that would be fantastic.”

The excitement in Pete’s voice is entirely genuine, and with good reason.

By combining the biggest and most powerful surface warship ever constructed for the Royal Navy with the world’s first supersonic STOVL (short take-off/vertical landing) aircraft, the UK Armed Forces will have a ‘matchless capability’ when they enter service in 2020.

But ensuring the two elements operate seamlessly is no easy feat, which is why the carrier integration work at Warton is so integral to the programme’s success.

“The beauty of this is the carrier has been designed with the aircraft in mind,” explains Pete.

“It’s not an anti-submarine carrier that has been modified for F-35 – the QE carrier has been designed for F-35 right from the outset, so I think the two will integrate very well.

“That work began many years ago and the stuff we’ve done in the simulator at Warton has been incredibly important because

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many of the results of those trials fed into the design of the deck – the markings on the deck, the lighting on the deck, the systems.

“There are various shipborne systems that will help the pilot when landing, particularly in high sea states when the conditions are challenging and the deck is moving around quite a bit, or at a night when there is limited visibility.

“But the sim work hasn’t just been about developing the flight controls software in the aircraft, it’s also about finding out how

to fly and carry out certain manoeuvres, and working out various flying techniques, such as shipborne rolling vertical landing.

“We’ve brought together a cross section of individuals to do that, from very experienced Harrier pilots with legacy experience to US Navy conventional F18 pilots, and also Royal Navy and other Airforce pilots who have no shipborne or STOVL experience.

“That has been done to ensure the design is optimised for all levels of ability, and all levels of scale.”

Pete has spent the last four years working on the F-35B programme as part of the Integrated Task Force (ITF) based at Naval Air Station Patuxent River in St Mary’s County, Maryland.

The ITF comprises personnel from the US Navy and Marine Corps, the UK Royal Airforce and Royal Navy, and industry partners, including 30 engineers from BAE Systems in the UK.

Together, they are testing two variants of the F-35 – the B model (short take-off/vertical landing) and the carrier variant (C model) – and their mission systems.

Testing is intense – Pete can be flying for up to four hours per day – and the end

game is to expand the edges of the F-35’s flight envelope, while also enhancing its manoeuvrability within those boundaries.

“Obviously I work for BAE Systems, but I think the fact that we’ve got a team of 30 or so engineers out here who are intimately involved in this, not just on the STOVL side and the B model but we also have one of the lead engineers on the C model which is the US Navy variant, is a great success story.

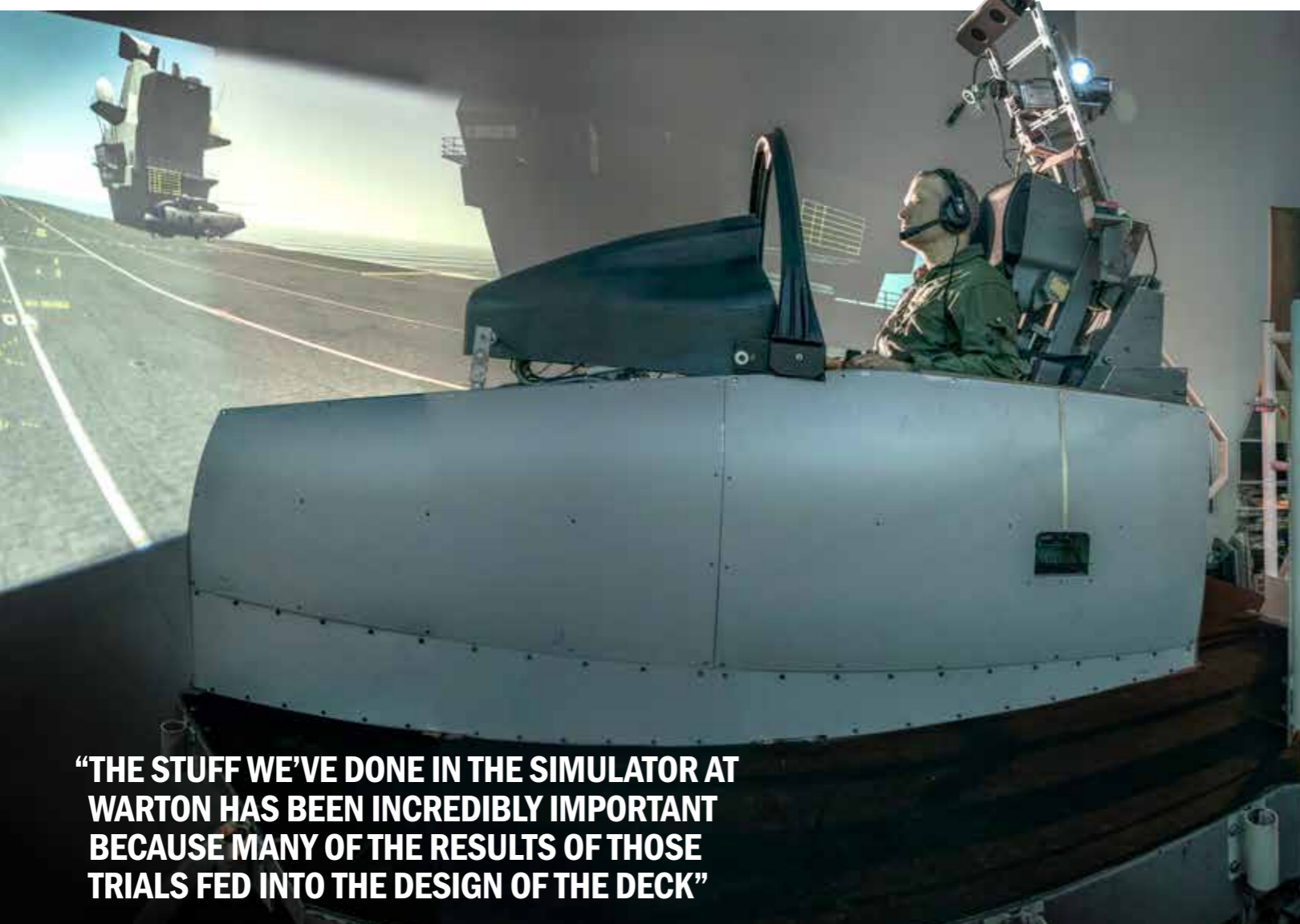
“Some of these guys have been working on the design and development side for 10 years plus, and now we are into the flight test stage, they are either working on the flight tests directly or they are engineers who are looking at and analysing the data we produce from those flight tests.

“It may be weeks later before we find out that the point we flew was good, or there was a problem in the point that we need to look at again, or we might need to change the software.

“So it’s not just about expanding the envelope of the aeroplane, it’s also about developing the software to make the aircraft better, and each member of the BAE Systems team is vitally important to that process.



Aircraft Carrier Alliance



**“THE STUFF WE’VE DONE IN THE SIMULATOR AT WARTON HAS BEEN INCREDIBLY IMPORTANT BECAUSE MANY OF THE RESULTS OF THOSE TRIALS FED INTO THE DESIGN OF THE DECK”**

**FACTS AND FIGURES**

- The QE Class Aircraft Carrier is the largest surface warship ever constructed for the UK and represents a step change in joint capability
- It’s 56m from keel to masthead, which is four metres taller than Niagara Falls!
- The distribution network on board will generate enough energy to power 300,000 kettles or 5,500 family homes (a town the size of Swindon)
- 1.5 million m<sup>2</sup> of paintwork, which is 370 acres, or slightly more than size of Hyde Park
- The ship’s two propellers will weigh 33 tonnes each – two-and-a-half times as heavy as a double decker bus and one-and-a-half times higher
- Each of the two huge aircraft lifts can move two F35 aircraft from the hangar to the flight deck in 60 seconds
- It can take up to 40 aircraft, which is double the capacity of its predecessors
- The F35B IS are expected to carry at least twice the payload of the Harrier
- The maximum embarked air group is up to 36 F35s and four Airborne Early Warning aircraft – double the aircraft capacity of the current carriers
- The ship’s Long Range radar is the same size as a large mobile home
- The ship will produce more than 500 tonnes of fresh water daily via its onboard water treatment plant.

**“WE WILL BE ABLE TO LAUNCH A STEALTHY, SUPERSONIC STRIKE AIRCRAFT FROM LAND OR SEA FROM PRETTY MUCH ANYWHERE IN THE WORLD ON DAY ONE OF A CONFLICT”**

“They are very well respected by the organisation here, so they can all be really proud of their involvement in what has been achieved up to now.”

Pete is already counting down the days to 2018, when flight-testing from HMS Queen Elizabeth is due to commence.

But what can those test pilots lucky enough to be chosen for those trials expect? And how will the F-35B compare to its predecessor, the Harrier, which was the aircraft of choice for the old Invincible class carriers?

“By the time the F-35 comes into service and has been fully tested, there won’t be many Harrier pilots flying it – it will be a much younger generation,” says Pete.

“The aircraft itself, and the control and handling it has in slow speeds in STOVL mode 4, is exceptional.

“I’ve landed at night on a ship in the Harrier and that’s a really exciting – but also scary – event.

“You are probably the most aroused you will ever be as a pilot in terms of focused

concentration, but that doesn’t mean you can’t make a mistake.

“When a pilot is working really hard, he’s using up a high proportion of his capacity and his ability to spot things, to see things, and to cope with things is affected.

“In the Harrier, you could easily miss one aspect of your technique, miss a problem with the aircraft, or not hear a radio call, so it was easy to lose track of what was going on.

“But this aircraft works so well for you, the extra capacity that allows you is a big bonus. It means a pilot can deal with an emergency better, or follow a particular technique better, so the execution of your approach and landing on a ship is going to be way more efficient.”

The real acid test will come in 2020, when HMS Queen Elizabeth becomes fully operational.

With her 4.5 acres of flight deck and 40 F35B aircraft able to deliver bombs with pinpoint accuracy hundreds of miles away, she will deliver a radical change in the Navy’s capabilities.

“The capability will be something the UK has not had for many decades,” adds Pete.

“We will be able to launch a stealthy, supersonic strike aircraft from land or sea from pretty much anywhere in the world, on day one of a conflict alongside our NATO allies, which we haven’t been able to do for a long, long time.

“Of course, we need to be wary of backing that up, and having the carrier and the F35 embarked clearly needs a support structure to make it as effective as it can be.

“But operating the two together will provide the UK with a matchless capability.”