

## Defence Committee

### Oral evidence: The Navy: Purpose and Procurement, HC 168

[Tuesday 29 June 2021](#)

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Watch the meeting

Members present: Mr Tobias Ellwood (Chair); Sarah Atherton; Mr Mark Francois; Mr Kevan Jones; Mrs Emma Lewell-Buck; Derek Twigg.

Questions 36-107

#### Witnesses

**I:** Sir John Parker, GBE FREng, and Ian Waddell, General Secretary, Confederation of Shipbuilding and Engineering Unions.

**II:** David Lockwood OBE, CEO, Babcock International Group, Sam McBriar, Director of Strategic Marketing for Maritime, Thales UK, and Glynn Phillips, Group Managing Director Maritime and Land UK, BAE Systems.

Written evidence from witnesses:

- [Thales UK \(NAV0018\)](#)
- [BAE Systems plc \(NAV0019\)](#)
- [Babcock International \(NAV0027\)](#)
- [Confederation of Shipbuilding and Engineering Unions \(NAV0031\)](#)



## Examination of witnesses

Witnesses: Sir John Parker and Ian Waddell.

**Chair:** Welcome to this Defence Committee hearing on Tuesday 29 June 2021, in which we will focus on the Royal Navy's purpose and procurement, specifically looking at shipbuilding.

I am delighted to welcome Sir John Parker, who is the independent reviewer of the National Shipbuilding Strategy; Ian Waddell, General Secretary of the Confederation of Shipbuilding and Engineering Unions; David Lockwood, CEO of the Babcock International Group; Glynn Phillips, Group Managing Director for Maritime and Land UK for BAE Systems; and Sam McBriar, Director of Strategic Marketing for Maritime, Thales UK. Thank you all very much for joining us this afternoon.

We are dividing our study into two parts. The first panel will involve Sir John Parker and Ian Waddell. Thank you for your time. Could I begin by asking what your reflections are on where things stand today? We have had the Integrated Review, a major statement of our advancing our defence posture; we then had the MoD's Command Paper; and then the Defence and Security Industrial Strategy. We are still waiting, of course, for the UK Shipbuilding Strategy, but is there a renaissance? Are you looking at a positive, glass-half-full approach to UK shipbuilding?

**Sir John Parker:** Thank you very much, Chair. I think I tend to live life with the glass half full in any event, and as a former shipbuilder it is the only way to survive.

As far as I am concerned, I was encouraged when I went back to the MoD to conduct a review on implementation to find the extent to which it had been implemented, although there are a number of issues that we might return to that were not fully implemented at that time. But the result was that within a little over two and a half years from the initial review, five Type 23 frigates were ordered in absolute record time. That, for me, was very encouraging.

From what I understand, you will be hearing from Babcock; they have gone about that in a very positive way. I have also been very encouraged by the BAE success with the Type 26 sales to Australia and Canada, which I think demonstrates the UK's technical capability on sophisticated ships.

If you broaden it out, I think the fact that the two carriers were completed, technically very satisfactorily—I think they are regarded across the world as being done in pretty good time and commercially successful. So I feel that there has been quite a resurgence, but now the time has come to really start to consolidate and, if possible, drive further volume into the industry. That might be a topic we should pause on.

Q36 **Chair:** Certainly, we will explore that in more detail. Ian Waddell, your initial reflections, please?



**Ian Waddell:** Thank you, Chair. It is one of those things where you wait for a report to come along, and then there are three in the same week. That was a very intensive week, when those reports were published.

My view would be that the Integrated Review is impressive in terms of scale and ambition, projecting global Britain. The concepts that are in there and the cross-service approach and co-ordination is really quite impressive.

I think the Command Paper was short on some detail, to be frank. On DSIS, we have been calling for an industrial strategy ever since the last one was abandoned, so the fact that a Defence and Security Industrial Strategy has been published is welcome for us. There are some problems with it, in particular around naval procurement, but I am sure that we will return to that later.

One of the major problems for us is that while it is welcome that there is no more competition by default—that is absolutely the right approach with naval shipbuilding—DSIS then says that for each vessel or each procurement, the MoD effectively reserves the right to add anything from single source at one end through to full international competition at the other. Our view is that that is a fundamental problem.

What the shipbuilding industry needs, what our members need, is some certainty for the next 30 years, if possible. Sir John called for a 30-year pipeline of work and the MoD is working on that. What we need is a clear commitment for that 30-year pipeline of work to be built largely in the UK. That will give privately owned, shareholder-driven companies the confidence to invest. That in turn will drive greater productivity and cost-effectiveness, and will improve on what are already world-class shipyards.

We could be even better if the industry was underpinned by that certainty. Unfortunately, just that one clause hangs huge uncertainty over the industry. How can any shareholder or company invest if the MoD might say, “You have won this one, but next time round we’re going for full international competition”? A tap could be turned on and off with each programme, which is the problem our industry has suffered for decades. It is half full and half empty at the same time. I don’t know if that makes any sense, but I suppose it amounts to the same thing.

Q37 **Mr Jones:** Sir John, I don’t disagree with what was in your report or what Ian has just said about industry needing certainty over a longer period. Type 31 is not a sophisticated warship compared with other programmes, such as Type 26. Do you have confidence that the MoD is getting away from the Treasury-driven aspect of programmes continually being pushed to the right to fit the in-year budgets, rather than what is needed, as Ian outlined, which is for industry to know it will get the drumbeat of work through?

HMS Glasgow was 10 years in the building, whereas Australians are building their first one in five years. Has there been a change in the Treasury and MoD, to ensure that we don’t make the programmes fit the



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in-year budget, but rather get what you wanted in your report—a clear road map of work over 30 years?

**Sir John Parker:** First, I agree with Ian that it is very important. If you look at the 30-year programme, which I recommended in my report, the whole purpose of it was to give visibility right across Government, and to this Committee and industry, to give some certainty that that work was coming down the line. What has bedevilled the industry is the pace at which orders have been placed in the past, and the long cycle time between concept and contracting.

The Type 26 was a very good example, where it was something like 19 years from concept to contracting. During that time, the design went through many iterations. The problem is that it then caused a massive pushing to the right when the Type 23s were being replaced. We now have Type 23s going on until they are 35 or 36 years of age, consuming massive amounts of cash in keeping them going, instead of getting the ships ordered on time.

The Type 31s were ordered on time because of changes I recommended. RN and others got involved to make it happen through the new governance system that was recommended. I don't know the extent to which that will be applied in future projects. I am not in a position to comment on that.

I would have thought that it is critical that this Committee takes a keen interest in the timing of new orders. You have access to the 30-year plan and the timings are indicated on that plan. The question is whether there are the right ships and the right equipment for the tasks and role for the current strategy that has been defined. The timely contracting to avoid gaps in programmes is critical in my view, if you want to have an efficient industry.

The two words I used in my report were pace and grip; pace to get things done to avoid programmes being shunted to the right. One of the key aspects of that is having from the Treasury through the sponsor board an assured budget that will not be impacted by being raided to keep operations going. That is another important point.

The reality is that if you want a world-class, competitive shipbuilding industry, you need to have a sustained volume that will utilise the capacity that is available. That will then absorb employee and overhead costs, and get them absorbed effectively, and more importantly, the hollows in the workload, the stop-go that we have experienced historically. That stop-go model wipes out profits and does not support stable employment, and it does not give confidence for the level of investment that really, ideally, is needed.

Q38 **Mr Jones:** I don't disagree with anything that you have just said, Sir John, or what Ian has said, but that means that there will have to be a huge psychological change in terms of the way the MoD orders at the moment. Clearly, it is not just in naval shipbuilding, but in other



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programmes that the natural default position, usually of the Treasury, is to push things to the right to ensure that it fits the in-year budgets or peaks and troughs in the budget, rather than what you are suggesting. In terms of your review, do you know whether that message has got through to the Treasury?

**Sir John Parker:** Well, I would hope so. When I see an assured capital budget, if you are in major industries—for example, I have been in the mining industry—with huge capital to sink, the one thing that the board would never do is raid that capital budget to slow down a project, because as soon as you slow it down, you have massively increased the cost of it, delayed its earning power to the right and so on. That assured capital budget as distinct from operational costs is very important and should not be raided in my view.

Q39 **Mr Jones:** If I can have one final question: should we be asking the MoD for a timeline in terms of when these orders are going to be placed?

**Sir John Parker:** The 30-year programme has notional timelines of when ships are needed to match the strategic needs of the Navy. Therefore it was a document that I felt was part of my review. The sponsor board should use that document, as I said earlier, to have the link with industry, with this Committee and the Government so that you have visibility over that period of time. You can challenge, “Are these the right ships?” “Is this the right equipment coming down the line?”, but sitting where you all sit in the Committee, the one thing I think is to ensure that the timing does happen when it is planned to happen; otherwise you are going to increase the cost of that project and delay and increase the cost of the ships that should be replaced. There is a cash consumption going on here of public money that I believe my review attempted to arrest and address.

Q40 **Chair:** Ian Waddell, any comments on Kevan’s question?

**Ian Waddell:** Just a couple of things to say. I have three sentences in front of me that were actually written by Sir John Parker in 2016, and I think they absolutely sum up the state of the industry as it was then and may still be now. He said in his covering letter to his report:

“The current situation is that fewer (more expensive) ships than planned are ordered too late. Old ships are retained in service well beyond their sell by date with all the attendant high costs of so doing. This ‘vicious cycle’ is depleting the RN fleet and unnecessarily costing the Taxpayer.”

I absolutely take on board that the procurement of Type 31 was done quickly, but we still have got the same problems: with Type 26 only the first three ships are on contract, the next five—and don’t forget by the way that there were originally supposed to be 13, but we are now building eight—are not on contract yet. That brings a whole level of uncertainty when we should really be very straightforwardly committing to building those ships as part of a 32-ship international fleet now.

The elephant in the room for me is the fleet solid support ship. It is a source of great frustration to me that when I first became a national



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officer in 2005, my national committee had a visit from Hans Pung, who had just written a report for the RAND organisation, commissioned by the MoD in 2003. It took them two years to publish. He absolutely forecast a dip in workload after the completion of the carrier, and suggested that work was spread out, that collaboration between yards was implemented, and that the timing of projects was such that there was a steady drumbeat of work.

Here we are 16 years later in exactly the position that RAND forecast in 2005. Immediately after the carrier was finished, we should have started building three FSS ships in UK yards, using the carrier alliance as the model for doing it, with block builds around the country. That is then the bridge to Type 32, Type 83 and whatever else this nation wants to do. Instead, FSS is moving further and further to the right. The existing vessel—I think we have only one left—is absolutely on its last legs. We are spending a fortune to keep it at sea.

It is so frustrating from an industry point of view to see these reports published, and absolute common sense being laid on the table, yet it doesn't seem to stick. I just hope that this inquiry results in some recommendations that actually make a lasting change for us that addresses the completely forecastable and foreseeable problem that we have.

**Q41 Chair:** May I put to you the question that I am going to put to the second panel of representatives of Babcock, BAE and Thales? Do we make our vessels too complicated? You are saying, quite rightly, that it is costly to keep them at sea beyond their sell-by date, but RFA Argus is still at sea. That was built in the 1970s, and for all intents and purposes is doing incredibly well. It is a very versatile ship. Shouldn't we have far greater modularity in our ships—a far simpler skeleton of design, which then allows them to be upgraded without huge refits, at huge cost as well? Is that the direction of travel in which we should be going, Sir John?

**Sir John Parker:** That was certainly the direction that my report took. It emphasised that for our export capability, because we haven't been so successful until recently, we need to have a base specification and design but with a great degree of modularity capability to adapt itself to upgrading of weapons systems or communication systems, et cetera.

That is what we now have in the Type 31e. The "e" was put there to emphasise to designers that we must hold on to that aspect of modularity to give a competitive edge in the market. Otherwise we are taking full specified destroyer specifications in some cases, and it is not possible to sell those directly into countries other than very mature markets. To get ourselves into the export lane, what you have just said is absolutely very important and, to me, crucial.

**Q42 Chair:** Ian Waddell, any reflections?

**Ian Waddell:** Absolutely. I agree with that to some extent and disagree slightly with Sir John. The biggest success at the moment in our industry is the export of Type 26. Actually, when you look at what the Australians



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and Canadians are building, what is in common is the hull and the propulsion system, effectively. What is above decks, in terms of the combat systems, the weapons and everything else, is different for each of the navies. I think that demonstrates some modularity.

These are complicated ships. They are anti-submarine warfare, so they have to run quiet. They have to have all the detection equipment. This is a rapidly evolving area of military operations; our potential foes are always developing their submarines, so it has to be at the cutting edge of technology.

I remember a number of years ago talking to BAE Systems and they said, "Here's the design for the global combat ship." And to be honest, we were all pretty cynical that there would be any export orders for that ship. I think everyone expected that the Type 26 was going to be a Royal Navy one-off and the Type 31 was going to be the vessel—the simpler, less complicated, more modular vessel was the one that was going to win export orders. It turns out actually that the Type 26 is a fairly niche product. There are not many nations producing that sort of complex anti-submarine-warfare vessel, and there are quite a number of nations producing frigates like the Type 31. So it is not necessarily the case that a more complicated vessel is unexportable; it depends on the job of that vessel and the market that we would be operating in.

But I do think modularity is important. If you look at the designs for the Type 31—I don't know much about the Type 32; I don't know whether anyone in the industry does, to be honest. But if you look at the Type 31, there are modular mission bays. It's the same with the Type 26. You can configure the ship with different container-sized modules that go on to the ship in different missions. That is obviously a feature, and these ships that are being built now will probably be in service for 40 or 50 years. As you have pointed out, if you think about the technology in the '60s compared with now, there has been a huge amount of change. Change is happening at an exponential rate, so in 40 or 50 years' time, it will be unrecognisable, so the ability to adapt those vessels is absolutely critical and needs to be built in.

**Sir John Parker:** Just to be clear, Chairman, I don't think I am on a different side of the street from Ian. I did mention earlier the huge success, in my view, of BAE and the Type 26. We are dealing with a mature market in Australia and Canada, but for other markets you can't sell as sophisticated a ship directly in there; you are better to go in with a lower spec and the ability to adapt.

**Chair:** Thank you for that. Derek Twigg.

- Q43 **Derek Twigg:** Sir John, can we increase the productivity and sustainability of UK shipyards without inviting foreign competition for programmes like the fleet solid support ship, and if so, how? If we reduced foreign competition in the UK shipbuilding industry, would that make it harder to co-ordinate procurement with allies?



**Sir John Parker:** If I may, I will take your first question first. I come back to the volume and a sustained volume. That is actually a prerequisite, in my view, for driving productivity, because the humps and the hollows, the under-utilisation, is a big negative. Of course, the next stage is then to ensure that our yards have global competitiveness plans, which is something that, again, in my review I recommended.

When we come to major projects, each yard should produce its own upgrading of its technology, its production methods etc. over what is the long life of a programme. I believe that's an important element—that there are clear plans to drive productivity and efficiency. But that also requires investment and therefore you are back to what I said earlier. A stable workload and avoiding the hollows means that—and if you have the hollows, you haven't the same capability to invest, so night follows day here. Furthermore, I think it is very important, in settling contract terms, that there is adequate headroom in margins to allow for investment in support of those global productivity improvement plans. That is another important aspect of this.

Let me just touch on foreign competition, because it's a sensitive subject. The best benchmark of competitiveness is to compare your X-yard prices with export prices—other deals that have been done across the world. And on the Type 31, for example, and the price window that has been agreed, it is well within the levels of export prices being quoted by major yards in major economies.

I would be optimistic that with a stable workload, and by continuing to invest in performance improvement through good planning and sensible investment, we can emerge in a world-class state, but it has to be a planned, co-ordinated and total effort between the industry, the Government and the MoD in particular.

Just touching on the foreign competitiveness again, I started off by saying that to drive volume was very important, and our international competitors and the major nations certainly do that. They build all their grey ships at home. We also have to accept and be realistic about the fact that there is no realistic opportunity for yards in the UK to sell their grey ships into these markets in Germany, France, Spain, Italy and Korea. Therefore, we are certainly among the lone mature nations that are seeking to build in those countries. That question is not for me to answer, but it draws attention to the fact that if we want to increase our volume, that is certainly one way whereby other ships, other than pure warships, can be built in the UK.

The other point I would make is that I did the review for the carriers when they were about to be contracted. The cynicism then—that UK yards could not build these two massive, sophisticated ships—was immense but, in fact, they have been built, and built very successfully. Technically and commercially, relative to US prices for those large ships, I think they would be judged a success.

Q44 **Derek Twigg:** Ian, do you want to add anything to that?





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**Ian Waddell:** Absolutely. This is the critical question, in a way, for us. I have to say that I represent, through my confederation, tens of thousands of workers in this industry, and there is a general sense of confusion about why it is that, now we have left the European Union, we seem to still be implementing European Union competition regulations and citing them in putting our workers' jobs up in competition against foreign yards. I don't think people in the industry understand it. Wasn't that the whole point of our taking back control—that we could make decisions to build these sorts of things in our own shipyards?

Putting that to one side, the nub of the answer to your question is that I do not believe that competition drives efficiency and effectiveness, from what I have seen. There is a myth inside some of the corridors of power in the MoD that somehow British yards are uncompetitive and inefficient, that the companies are greedy in some way, and that the only way you can deal with that is to expose them to the cut and thrust of global competition in order to drive the prices down and drive the efficiency up. It is a complete fallacy. That is just not the way that the industry works. It is not the way that the companies operate.

There are two brilliant examples of what the UK yards can do. Sir John Parker has mentioned one of them. The senior executives and companies involved in the Aircraft Carrier Alliance were so stressed by the pressure they were under, in terms of both the time deadlines and the cost that they had to deliver that project to. Inside the industry, there was huge pressure from the MoD through the construction of the joint working group, whereby the MoD were inside with executives and managers of the companies that were building the carrier, which for me was a massive success story. It was £6 billion for two aircraft carriers.

Compare that with the global market—you would probably get one carrier in the USA or India for that price. We built world-class vessels using that construct, and it seemed to me that the obvious thing to do was to carry that on for the next generations of vessels. It seems to me that that is a much more effective way of working. It takes robust management from an MoD point of view, but that was down on the carrier, and I see no reason why it could not be done again.

The other example I would mention is Barrow, where you can see both ends of the spectrum. Before the Astute programme began, that shipyard went from 13,000 to 3,000 workers. People in Barrow will say they basically forgot how to build submarines—the collective knowledge was lost. Hence, there was huge cost, time delays and overruns at the start of the Astute programme. That has now been sorted. I watched the last sections of the last Astute boat going through the yard—the shutters went up behind and the investment and renovation went in to start building Dreadnought.

There are now 8,000 people, including 1,000 apprentices, at Barrow. There is fantastic commitment to the future, driven by steady state operation and giving the company the ability to invest in that yard, take people on and train apprentices who will be there for the next 30 or 40



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years. Barrow is an area that needs that economic input. Without that shipyard, that town and region would be dead.

There are clear examples already in our experience of where collaboration, co-working and really robust contract management will drive world-class performance in our shipyards. Compare and contrast that to FSS, where we have had a failed competition already—twice, I think—and we are now two or three years beyond the original deadline. If you go back to the Rand corporation report, these ships should have been sailing by now. They have moved so far to the right. We have missed a huge opportunity.

My simple answer is that I do not believe competition drives efficiency and effectiveness, and it is a real mistake to think that is the stick that you need to beat the industry with. It is the wrong approach.

**Q45 Mr Francois:** With regard to carriers, the Committee recently visited HMS Prince of Wales, and as a result we can all attest to what an impressive ship she and her sister ship the Queen Elizabeth are. We wish QE the best of luck on her deployment.

Coming back to Barrow, that is not quite the whole story, is it? On the Astute programme, the problems have not all been recovered by any means. Some of these boats will be delivered years later than originally planned, meaning that the Trafalgars, which have given great service, are a bit old and tired. They are venerable boats now. We have had to run them on at great cost, exactly as Sir John was saying, because of the delays to Astute.

There are many reasons; skill fade is one. Another is that Rolls-Royce, who make the nuclear reactors, moved their manufacture right across Derby and lost two years as a result. Let's be honest about it: there has also been some chronic mismanagement of the Astute programme. If we are going to talk about what has gone wrong on such programmes, it is important to be honest. It was partly problems by BAE Systems, certainly problems at Rolls-Royce and also chronic mismanagement by the MoD. That is a more rounded and fairer assessment of what happened with Astute, isn't it?

**Ian Waddell:** I think, in effect, that is what I said, to be honest. I do not disagree with you. What we have had is because of that loss of knowledge and experience, and some of these industry-wide issues. I am not here as a spokesperson for industry—I represent the workers. Quite often they are frustrated and scratching their heads about what their management teams do.

I am saying that what happened with Astute is an apocryphal tale. The lessons still being learned at Barrow should be applied on a wider basis across the whole of the ship building enterprise. I would go further and say that you could apply that across the whole of the defence industrial base. These are long-lasting projects and long in the gestation period, highly skilled and at the cutting edge of technology. All that screams that



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you need continuity of workforce, of investment and of the pipeline to keep that drumbeat of work going.

Barrow should be a lesson to all of us about how long these problems will go on if you get that wrong. I do not disagree with you. The problems with the Astute programme are well-known and everybody concerned is doing their best to recover it, but it is a problem that we created collectively. It was foreseeable and forecastable, which is exactly why I am saying we are looking forward with shipbuilding.

**Q46 Mr Francois:** I do not want to delay the Committee inordinately, but I take the point about the steady drumbeat of work; I think that is a strong point. But moving reactor production was nothing to do with the drumbeat: that was just a disaster, so that was chronic mismanagement of the overall programme. It is true, I think—unless you are going to contend with me, sir—that you talked about the ills of international competition, but at one point they had to go to GD electric boats on the USA's coast to assist them with putting some of these problems right, so to be fair, the Americans helped us on that.

I think what really worries the Committee is the knock-on to Dreadnought, because the budget for Dreadnought is £31 billion, but there is a £10 billion contingency, and there are some people who seem to regard that extra £10 billion as free money. The Astute programme is not an encouraging precursor to the Dreadnought programme, because if Dreadnought goes anything like Astute, we will lose continuity of CASD. That is why the Committee is particularly concerned.

**Ian Waddell:** I do not disagree with that. I would quite happily—over a pint in the Strangers' bar, perhaps, Mark—have a debate with you about how we lost our world-leading position in the nuclear industry in this country. After the Second World War, we were in a superb place, and we effectively handed that technology in large part away, but that is a separate question.

As I say, I am not a spokesperson for Rolls-Royce: I think there are questions there that you would need to put to them. All I know is that those 8,000 people in Barrow are doing their absolute damndest to deliver the boats on time, on schedule, and at reasonable cost. Your questions should be directed at the management representatives in the next session, perhaps.

**Mr Jones:** What happened on Dreadnought was the coalition Government's delay in terms of putting the contract out for the successor, which I know Mark and I were arguing we should do at the time.

**Chair:** If I may, we will come back to the submarines a bit later. I want to focus a bit on whether we have the tools of the trade to be internationally competitive.

**Q47 Sarah Atherton:** Sir John, you mentioned earlier a level of improvement within the procurement process and timelines, and the T31 has been widely praised—partly, I suppose, due to its proven design and its simpler



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design, and partly due to digitalisation through investment by Babcock. This Committee has been told that shipbuilding and Navy procurement would benefit from increased digital design of procurement tools, so if we start with Sir John, would you agree, and what are the challenges to implementing this?

**Sir John Parker:** I come back to the point I made earlier, and which we underlined in the review: each yard on major projects should have global competitiveness plans attached to them. We pointed to areas in, for example, cruise ship building in one or two particular yards in the world, where digital engineering and digital systems that are driven off the digital model are crucial to improving productivity in an organised production on the operational side of the business.

There is a whole raft of issues that you would expect to be addressed in a competitiveness plan: certainly technology and digital engineering, but also modern working practices; intensive training of the highly skilled people who are needed, particularly in some areas; and modern tooling and modern jiggling. Today's modern block-building techniques with advanced outfitting need a great deal of logistical control to be done in an effective way. I think that this also needs investment, but the returns on investments in digital engineering and the modern systems of production that follow that are indeed pretty impressive.

I have quite a lot of experience of dealing with the German yard Meyer Werft, where we build a lot of our cruise ships in Carnival. There, they have very heavily invested—with help from the German Government—in a whole range of new technologies that are driving very impressive times of production. We ordered four ships at close to €1 billion each in 2015. All four were to be delivered by the end of 2020, which was an amazing challenge. Despite covid, three were delivered inside 2020, and the last one, the Iona, was delivered to P&O in April. That is a very modern example of how modern shipbuilding technology is really at the top of the league. There is no reason, knowing the capability of the technical people in this country—our naval architects and engineers—that they cannot do it, but they need some margin inside their business in order to make that investment. That is part and parcel of good contracting, where there is fair risk sharing, a decent margin and clear incentives to deliver on time and incentives on quality. It takes us all working together with one goal to create a modern, high-performance industry; that takes our customer base, and Government in this case, and industry working in a constructive way together.

Q48 **Sarah Atherton:** Do you think it would require extra scrutiny of the plans by the MoD if we were to follow this digitalised route?

**Sir John Parker:** I would hope that the recommendation I made on launching global competitiveness plans would be scrutinised by the MoD; that was the intention. I am not sure how far that has gone, to be very honest. I am in danger of passing my sell-by date, since it is some time since the report was lodged and my second review was lodged. Having said that, the notion was exactly aligned with the question you have put—



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global competitiveness plans, prepared by the yards, with some headroom for investment, and the MoD would scrutinise those and work with the companies to ensure that it happened, because the benefits come in future contracts and in more certainty on your existing pipeline of contracts.

**Sarah Atherton:** Thank you, Sir John. Ian?

**Ian Waddell:** I am surprised by the question in a way, because it almost implies that this is not already happening and is something for the future. The fact is that it is already happening. I have been to a number of yards around the country and have strapped on the VR headsets and walked around compartments and looked at the routing of pipes and electrical systems and ventilation systems. These are used by designers and engineers to work out where there are problems in the construction—"If that pipe goes there, we cannot access that ventilation shaft"—and the design is tweaked as a result. I have been in the production sheds where we are looking at robot welding and machines and all sorts of new techniques and technology being introduced into the shipyards. It is an ongoing process. Every time there is a new order and a new class of vessels, there is a step up in the level of investment.

Going back to the Type 26, it is a shame that we did not procure all eight right at the start, because if you compare and contrast where we are on the Clyde with where BAE is in Adelaide, there is quite a stark difference. Adelaide has a brand new, world-class shipyard on the back of the Australian programme, and right next to it is a state-of-the-art research and development centre. The one thing that I think is missing in the UK, to pick up on Sir John's point, is the collaboration between industry and Government that you see in, for instance, civil aerospace, with the creation of the Aerospace Technology Institute, which was funded by Government and industry. It is world class. If we had that for our shipbuilding industry, I think we would take leaps and bounds going forward with this digital technology and state-of-the-art design and production techniques.

I am going to sound like a broken record, but that is all predicated on certainty. If we are certain about what we are going to be doing for the next 30 years and the money is committed, we can commit, invest and build an R&D centre that can be used to drive the sort of technological innovation that drives productivity, effectiveness and cost reduction. It is a virtuous circle.

Everybody in the industry will tell you that. I would be amazed if you can find anybody who won't, unless they have a vested interest in competition in some way. You won't find anybody in this industry who disagrees with what we are saying. That certainty for the next 30 years could absolutely be transformative. It could take what is already a brilliant industry and make it really world-class. We just need to crack on with it. We have been saying that for decades. Let's just get it done.

**Sarah Atherton:** Thanks, Ian. Back to you, Chair.



**Q49 Chair:** I mean, yes, let's just get it done, but we have to understand that it is taking 10 years to procure HMS Glasgow. That point was made earlier. The question that we as a Committee are seeking to understand is: why does it take so long to procure a ship? Why doesn't it take a lot less time to procure the sister ships? Navantia, the Spanish shipbuilding company, has built, I think, 40 ships in the last five years, and it is exporting and building ships for other countries. Can you help me understand why it is taking so long to complete any particular ship once you have the green light and the funding from the MoD?

**Sir John Parker:** First of all, if you look at the timelines, you mentioned 10 years, but in fact, from concept to contracting on the Type 26, it was something like 19 years. I had the timeline analysed when I was doing my review, and there were various milestones that were accelerated by two years, decelerated the next year by two years, then there would be a recovery period. It yo-yoed about, and time was lost right through that process. It was largely due to not having a ring-fenced capital budget. In other words, the budget was raided because it had to support operational costs, as distinct from keeping the capital intact to drive the programme through its design phase and into contract.

That did not happen on the 31e. The governance that I recommended—the sponsor board—was able to provide the capital. The client board—the ownership of the project—was chaired by the First Sea Lord and, alongside him, the Chief of Defence Procurement. They, together with other members of that board, drove that project through in the timescale that was done. It is a combination of an assured budget, the proper governance and monitoring that 30-year programme to ensure that vessels are ordered on time.

**Q50 Chair:** I hear that, but I still want to understand why we are slower than, let's say, the Spanish. Have they simply got their ducks in a row? Are they simply working to ring-fenced budgets themselves? Is that why they are better than we are at the moment?

**Sir John Parker:** I am not an insider on Navantia, so I am not sure how they operate. First of all, they are not building ships as sophisticated as the ones we are talking about. I would say that the timescales to produce the 31 are highly competitive with European yards. On the Type 26, I believe they are pretty comparable with world-class, but BAE will be able to give you more information than I can.

**Ian Waddell:** I have been to Navantia in Cadiz had a look around their yard, and I was quite shocked, to be honest. It is like stepping back into the 1950s. It is a bit of a head-scratcher. They don't have cutting-edge technology. We had a fantastic presentation about the world-class shipyard they are going to build, with robots everywhere, UAVs delivering steel to the line and all sorts, and then we went round the shipyard and, honestly, it was like stepping back 30 or 40 years.

There are two parts to the answer. First, to answer your question on Type 26, which people seem to have forgotten, the original plan for Type 26



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was 13 ships. We went through a really painful reorganisation and reconfiguration of the UK industry in 2016, with 1,800 jobs lost, the Portsmouth shipyard closed, and the concentration of production of frigates on the Clyde. The deal was that in return we would get 13 Type 26 ships and a world-class shipyard with £200 million investment.

The decision was taken to reduce that programme to eight ships in two batches—a batch of three and a batch of five. The absolutely clear result of that was that the production timescale had to be spread out to keep the workforce employed and the skills in place. It was shifting to the right, the drumbeat of work was slowed down, and the end date was extended. That was a direct result of the budget being cut, in my view. I don't know what happened before in the procurement process towards design. I can't answer for that—the company might be able to—but I was absolutely clearly involved in and understood that the decision to go from 13 to eight had a direct impact on the time it took to build each of those ships. The two things are linked.

To answer your question about Navantia, that is a state-owned yard, which we have often suspected is subsidised. We are worried about it being a potential competitor on FSS. We keep complaining that it is not a level playing field. You can't have privately owned, shareholder-driven companies competing against a state-owned yard that can afford to put in a loss leader bid and have the Government pick up the tab. You are not comparing like with like. I challenge anyone on the Committee or in the Palace of Westminster to convince me that, if we bid to build a ship for the Spanish navy, we would win over Navantia. The Spanish would never let us build their ships. Why are we contemplating having the Spanish build ours?

Q51 **Chair:** I know Kevan wants to come in, but I want to finish this point. They are building ships for Norway, Australia and even Venezuela. My question is to British shipbuilders. The UK Royal Navy should not be your only customer. Clearly, opportunities exist around the world. What more should we be doing to secure international orders, so it is not just about waiting for the next Type 26, Type 83 or Type 32 to come along, to keep our shipyards busy?

**Sir John Parker:** The Type 31e was designed specifically with the export market in mind, which is why the "e" is attached to it. It was designed in a modular form—a much lower-tech ship as a baseline—with the option for the nations that would buy that type of ship, and that Navantia sells to, that we would be able to compete directly with them and with the Italians and Germans.

That is a sector of the market that is different from the Type 26, clearly, but that has precisely been designed for that purpose, to give it a much lower capital cost to start with, and yet give navies the ability to upgrade either at the time of build or later in its life cycle. That is specifically the case. I also recommended that, in Government-to-Government deals, the Government should be supportive of that approach, alongside the Navy. I believe we will be successful in competing with that particular vehicle.



**Chair:** Thank you. Kevan wanted to come in.

Q52 **Mr Jones:** Isn't it the case, as Ian and Sir John have said, that we haven't got a level playing field? What we have in many places is direct or indirect subsidy. For example, I remember going years ago to the shipyards in Rostock, where huge amounts of German money had gone into upgrading them. I visited the yard in Brest a few years ago and asked the local MP if she could see a French naval ship not being built in a French yard. She said she could not understand the question, which summed it up very well. The other thing, Sir John, which you outlined about Type 31 in your report, was the hands-on project management, ensuring that costs were driven through and things like that.

Isn't the overall problem with the MoD budget—not just the naval budget—that, since the Levene review, we have had top-line budget heads devolved to individual services? The NAO report said a few weeks ago that a third of the accountancy positions in those budget heads are vacant at the moment. Unless you actually have not just the ring-fenced budget you refer to, but the ability to be an intelligent customer and drive things forward, things will not improve.

**Sir John Parker:** You have put your finger on the whole governance issue. At the MoD, very few people at the senior level would deny the fact that ownership of a project is always difficult to define. That is the whole purpose of the governance system that we recommended: having the sponsor board, which would have the 30-year plan and would agree cross-Government approval for us, and then having ownership with the end client—that is, the client board—and taking that budget and the role that the ship is to perform, and working up a design and specification within that budget and then having the power to contract. That makes ownership very clear and timelines to contract very clear. Those two facts alone are absolutely critical: the grip on spec and the pace at which you order.

I believe that if that is followed through project by project, with an assured budget and with proper empowerment of those boards, you will bring order and timeliness, and save money significantly over the next 10 to 15 years.

Q53 **Derek Twigg:** How can Navy procurement balance the need for innovation with the reliability of a proven design?

**Sir John Parker:** Almost every major company outside of the MoD and outside of naval faces that issue of staying with safe technology and yet recognising that if you do not embrace the new, you will be left behind.

In my view and experience, it's all about having the right people, the right technologies and the right engineers with the capability to risk-assess the impact of new technology and to plan for its orderly introduction in a way that will not disrupt the fundamentals of the operation.

I am certain that within our yards and within the MoD, you have the levels of competency in engineering needed to bring innovative ideas into new ships and new capabilities. That has to be there.





Q54 **Derek Twigg:** Where do you think the balance is at the moment? Is it 50:50 or is it not there? Is it too lopsided?

**Sir John Parker:** Take the Type 26—it is a world-class specification of technology. You take the 31—from what I have seen of it, the weapons fit and so on. The specification that the RN has used at this stage is “high technology”.

I am not so sure that we should be desperately worried about this, because there is enormous competence in our engineering capability in this country still—thank God. That gives me the comfort—it has always given me the comfort, whatever industry I have been in—to pursue the latest technology if it drives performance.

Q55 **Derek Twigg:** Ian, do you have anything to add to that?

**Ian Waddell:** I don’t know whether you are implying in the question the sorts of issues that were faced with Type 45 and the power problems, as an example of where things go wrong. I am not qualified to answer that on Type 45, but I am sure the next panel will be able to give you the detail. This goes back to what I was talking about in terms of the Adelaide situation with the R&D centre. I know there has been some discussion about potentially having a shipbuilding catapult or some sort of growth partnership for the industry where this sort of work could take place. That should be a no-brainer for us in a way. If you could get the best brains from companies across the UK collaborating with international partners and working on cutting-edge technology, and with digital twins or demonstrators testing the concepts and improving the reliability long before it gets to a live vessel, you have a much better chance of getting cutting-edge technology coupled with reliability in service. That is done in companies at the moment. I don’t see that collective, collaborative effort that we have in other parts of the defence sector and in other advanced manufacturing and engineering industries in the UK. For me, that is one area where there is an obvious oversight in the UK that could be corrected if we put up-front investment in.

Q56 **Sarah Atherton:** I just have a quick request to Sir John. After the Government publishes its updated National Shipbuilding Strategy, would you mind if the Committee got back to you with any questions we might have?

**Sir John Parker:** Well, I am certainly not a party to the preparation of this new shipbuilding. I would not be unhappy to give comments on it relative to what I have proposed, but I would hope that a lot of the elements that were proposed that have been demonstrated to work on the Type 31e contract would be somewhere buried in there, if not highly visible.

Q57 **Sarah Atherton:** Shall I take that as a yes, Sir John?

**Sir John Parker:** You are very persuasive. Let me see how we do.

**Sarah Atherton:** And you are very diplomatic. Thank you, Sir John.



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Q58 **Mr Jones:** Sir John, can I just ask who is actually drawing up this new strategy? You said that you are not involved in the new strategy, so who is drawing it up?

**Sir John Parker:** I don't know. I have not been party to that. I imagine it must be being drawn up by officials inside MoD.

Q59 **Mr Jones:** So you have not been consulted on the new strategy at all?

**Sir John Parker:** No, I haven't.

**Chair:** That is a bit surprising. On that bombshell—not that this is “Top Gear”—we have to move on. Thank you, Sir John. We will be in touch with you, even if the MoD is not. We have certainly valued your views and thoughts today, along with Ian Waddell's. It has been very informative indeed, so thank you.

### Examination of Witnesses

Witnesses: David Lockwood, Sam McBriar and Glynn Phillips.

Q60 **Chair:** We now move to our second panel, who have been digesting what we have been saying. You guys build these ships. We will start with David Lockwood from Babcock. You have heard the discussion that we have had. There is a concern. Yes, we want to see more orders, better timekeeping by the MoD and certainly a longer budget, but ultimately it is still taking a long time to build these ships. Can I have your reflections on what needs to improve?

**David Lockwood:** Gosh. So as Sir John said, I am not sure it is taking a long time to build a ship of this complexity.

**Chair:** Sorry, David, you look like you're in a witness protection programme. You are a bit dark. I don't know if we're able to improve the lighting, but no worries.

**David Lockwood:** I think probably I am in a witness protection programme, which is probably appropriate, given what I was told about your Committee, sir. *[Laughter.]*

**Chair:** Sorry to spill the beans about who you are. Anyway, the floor is yours. Please continue.

**David Lockwood:** Unfortunately the blinds have gone from the windows in my office and the sun has miraculously come out. That is the problem.

I am not sure that the length of time is long. We are still on schedule, despite covid, which I think is a huge credit to the seamen working on it. We have resourced up the engineering in line with the plan. We have hit all the milestones that we were going to hit, so I am not actually sure that I would agree. I am not sure that three years to get into the water and five years to acceptance is a particularly long time for a first-class ship.

**Chair:** Okay. Thank you for that. Glynn Phillips?



**Glynn Phillips:** As raised by Sir John earlier, there is probably a series of competing factors to determine the design and build programme. There were clearly historical challenges around how you balance the overall shipbuilding programme, so not just Type 26 in isolation but the end of Type 45, the carrier mobilisation, and OPVs within that. A lot of it is how you optimise across the whole of the programmes, not just one individual programme.

There were clearly areas through the design and assessment phase, where the cost capability trade-offs process went through, that took a number of years to get to the optimum output. Then, from a schedule point of view, the build programme was determined again to optimise how we get the ships into navies' hands and in service within the overall constraints of the programme in terms of profiling, budgets and the optimum build cycle.

**Chair:** Sam, welcome. Any initial thoughts?

**Sam McBriar:** Thank you, Chair. I would just like to come back from a systems perspective, rather than the building of the hulls, if you like. We suffer the same problem of a delay in flowing the money, the programme, and the visibility down to that part of the supply chain, so we would like to be much closer coupled to those programmes. I have to say that in Type 31 that has improved, with much tighter coupling between the platform, the systems, etc. If you look at the systems, that is where a lot of the digital transformation, the cycles and evolution are really fast. They have to be designed to be future-proofed and to be replaced and upgraded often. We need to think about the platform design and how that impacts on the ability to do that, so modularity and being able to swap things in and out are really important.

Q61 **Chair:** On that note, should we not push the modularity much further than we currently are? Do we need to go further than this? I mentioned RFA Argus, for example, which is actually a very simple ship, but it can be fitted out from a rotary support system to a hospital ship as well. There is just plenty of space on board. I look at the design of the Type 31 and indeed the Type 26, and we are certainly getting better, but do we not need to have a profound, fundamental change in how we design these systems?

I have a mobile phone in front of me. You probably all have one not too dissimilar to this. I am guessing that we are all going to have different apps on our phone. The phone is the same; it is the apps. The ship could be the same, but the apps—the systems that we have on board—could be the plug and play. That could allow far greater exportability, bearing in mind that the Type 26 that we have spoken about has been exported to peer nations. I doubt we are going to sell this to any African country, because it is too high spec for them. They would want something far simpler or to use the space on board. Do we not need a renaissance in how we build ships, and isn't Britain well placed, given the energy that we have and this capability that wants to be released, to provide that change? David, back to you.



**David Lockwood:** I have been overseas now, at last, in support of Type 31 campaigns, with, I have to say, Sam and Thales in very strong support. The configurations of those ships really are quite different. Sir John referred to it in his evidence. The baseline ship is a cheap ship—an affordable ship, I should say—but you can configure it in a number of ways, and you can reconfigure it quite quickly because it is quite a large platform. I actually think that we are only beginning to learn how to do that now that we have that opportunity.

**Chair:** Thank you. Glynn?

**Glynn Phillips:** I think I will provide a bit of context around Type 26. Type 26 has been designed from the bottom up to be the world's greatest anti-submarine warfare frigate. It is a completely integrated system to deliver the mission, so every facet, every aspect of it and every component has been designed with an acoustic noise and vibration characteristic that means it would meet the Royal Navy's very high-end requirement to be able to undertake operations, particularly in the north Atlantic and beyond.

Modularity in certain aspects of the platform itself is much more difficult to achieve. However, one of the really attractive features of the Type 26 for the UK and internationally is the multi-mission bay, because that gives modularity in terms of mission. It gives great flexibility to be able to use it in different mission modes, whether it is autonomous assets on board or off board, UAVs or humanitarian aid that is required. That provides the modularity of mission through that form. Equally—I think Ian touched on it—if you look at the global combat ship in Australia and Canada, that will have a different combat system and a different radar system. At the very high-end ASW frigate level, the modularity is there. It is probably there in slightly different forms than just plug and play on particular blocks.

Going back to the systems inside, we see the Type 26s in the current fleet, where we are driving towards an open architecture. In the past, each of the operators might have had their own screen to do a dedicated task. We are now moving towards more of the open architecture that you describe, where there will be one screen with multiple apps that could be called up to undertake different roles, which creates great savings opportunities within a ship, both in space and in things such as heat, weight and power. Those technologies are being adapted, but probably in means that are appropriate to undertake the ASW mission.

Q62 **Chair:** Sam, you make lots of the systems that go on board here. Would this be the direction that you would want to go?

**Sam McBriar:** Yes, we are looking at it. There is a real opportunity to work on the concepts here and bring them a lot further forward. If you want to push it further, you can look at containerising pods that are configured for particular mission types that include autonomous systems. The challenges of doing that are around command and control and making sure you have the open systems architecture that Glynn was referring to. We should be looking to the future a lot earlier and bringing those ideas



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into multi-industry teams. I am hopeful that the National Shipbuilding Strategy refresh will push on some of the concepts and digital technologies that will help unlock modularity and allow it to happen and to go further.

**Chair:** My personal view—it is not one that the Committee has come to agree with yet—is that we should be doubling the size of our surface fleet, given the force presence that we are going to require in the Arctic, the tilt to the Indo-Pacific, and east Africa, as well as in the Gulf, the Mediterranean, the Caribbean, the Black sea and places like that. We simply cannot do that with the size of the fleet at the moment. We cannot persuade the Treasury, if each ship is costing £1 billion a pop, so we need something far simpler that allows modularity with the use of drones—surface, sub-surface and air—so that the mother ship has the mission and the tasks that hold them on board, and which can then be replaced. That, I hope, is something that the industry would be able to embrace. That becomes very exportable, because you then have your catalogue of whatever it is that you want to buy. Let me turn to Sarah to pursue this a bit further.

**Q63 Sarah Atherton:** I would like to learn your opinions on the autonomous mine-hunting technology. We have heard positive reports of its progress, but we have also heard concerns about how mine-hunting capabilities will be hosted and what capabilities and processes are needed to use them to their best advantage. The Royal Navy press has stated that automated and autonomous mine-hunting systems will be deployed as early as next year, so how do we ensure UAVs are properly integrated within the broader fleet? Let's start with Sam, please.

**Sam McBriar:** Thank you for the question. We are the leader of a programme called MMCM, which is a revolutionary joint UK-French programme to introduce autonomous mine hunting to the Royal Navy and the French navy. The programme has been in a prototyping phase for some years. Five years into it—4,000 engineering hours—it culminated in a set of sea trials in the autumn, which we passed, and we proved that these autonomous systems could do the same job as the conventional systems. It has moved into production phase at the moment, and those systems will be delivered to the Royal Navy and the French navy, as you said.

It is important to recognise that a military capability is made up of not just the equipment. Obviously, it has to be secure. It has to deal with information. It has to have trained personnel using it. It has to be supportable. All of those things must be wrapped into the programme and tested over time, but in terms of whether it works and whether we can do that job, yes, we can. We have tested it in both a synthetic environment and a real-world environment, and it has got to that stage at the moment. It is a really interesting capability and it will change things significantly.

**Q64 Sarah Atherton:** You just mentioned supportability. How are they going to be supported? There is talk, with the Hunt class and Sandown class being retired, about how it is going to be hosted, and there is talk of a mothership, or lack of a mothership. What are your feelings around that,



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and how easy is it to bolt autonomous technology on to conventional capabilities? For us, what does that mean for procurement, costs and timelines?

**Sam McBriar:** It is certainly not going to flip from one to the other. There will be a phased transition, and a de-risking process going through that. The Navy is responsible for developing capability planning and looking at all of those aspects, but in terms of the hybrid solution of conventional systems working with manned systems, we have worked that through. We have solutions. Other nations are interested in those as well, so there are lots of different ways that you can do it. Let's face it, we are in new territory here. We are learning. We are very close to the Navy, helping them to introduce this capability, so hopefully that gives you some confidence in terms of how those plans are coming together.

**Glynn Phillips:** I agree that we are in the early phases of introducing some of these autonomous uncrewed capabilities. They exist in the market. The challenge is how you integrate them on an assured basis, particularly as we see the Navy's vision of the future is much more of a multi-domain mission system, so it is integrating air, surface, sub-surface, platforms and autonomous off-board assets. How do you integrate all of those in an assured way that provides assurance from a command and control and comms point of view, such that that, if you like, battlegroup can fight? That is the challenge and, as Sam says, we navigate through that with the Navy.

I think we have been able to do it on individual platforms and projects at the moment. From a BAE Systems point of view, in the last year or so we demonstrated an autonomous Pacific 24 boat being integrated with the Type 23 combat system, so being operated at reach, and there are other capabilities out there. That is the direction of travel for the Navy, and probably appropriately so. That will bring in whether it is a mothership or it is utilising other existing platforms. That could be a 26 on a mission bay. It could be an OPV. It could be other forms. That is certainly the direction of travel, but the challenge is how you integrate all of these capabilities such that the warfighters can use them.

Q65 **Sarah Atherton:** Do you think that the MoD have given that much thought? What have they said to you about that?

**Glynn Phillips:** They have certainly given it thought. They have published their vision and their ambitions. Now industry needs, as always, to support the Navy to bring that to life. It is going to be a challenge. It will be a pan-industry challenge, because no one player controls all aspects of it, but it is equally a huge opportunity for the UK Royal Navy in terms of having a capability advantage and being able to bring these things to bear in theatre. If we can demonstrate capabilities in these spaces to undertake these sorts of activities, that creates international opportunities as well. If you look at most international customers, they are heading in a similar direction of travel too.

**Sarah Atherton:** Exciting times, Glynn. David, do you want to comment



on that?

**David Lockwood:** The only thing, just to draw a couple of thoughts together, is that the Chair talked about modularity, and we talked about motherships. As a variant of Type 31, there are Type 32 concepts to operate exactly as motherships, particularly for autonomous mine hunting. There is perhaps more joined-up thinking going on than is apparent.

Q66 **Chair:** I think that is worth exploring for a second. I have still to be convinced that Type 32 was actually planned. It may have been a clerical error in the numbers, but it has provided an opportunity because there isn't a fixed idea of what it looks like. It allows us, yourselves and the wider naval community to have a debate about what is required. That is a very positive thing. It leads me to a question to Babcock. What is presented to you to say, "This is the ship that we want."? Do you get a list of specifications, to which you respond? Or is it more of a two-way conversation about what you think might or might not work?

**David Lockwood:** We are a relatively recent re-entry into shipbuilding for the Royal Navy. Type 31e originates from Sir John's inspired work of less than a decade ago, to create something that has all that flexibility and can address exports. There was a competition, we entered it against the spec. We had the debate and then went through a fairly standard but very rapid procurement process.

Since then, the most important thing, going back to a point Sir John made, was that we entered into a no-change programme. We all know—Glynn has experienced it more than we have—that change drives schedule, drives cost. We have agreed with the Navy and the procurement agency that we know what we want and we are going to build them. Notwithstanding comments about speed, we are going to build them at a speed that is unusual. That is what we've done.

**Chair:** My point was about the red teaming—to use that expression. Yes, there must come a point where you all agree, you leave the room, you are determined, but there must be an ability to have a discussion to work out different opportunities, cost-effectiveness, length of time to build. I fear we don't devote as much time as we should do to that.

Two other questioners want to come in here. First, Mark Francois.

**Mr Francois:** Mr Lockwood, we wish you the best of luck at Babcock on the Type 31 programme.

**David Lockwood:** Thank you.

Q67 **Mr Francois:** The Committee would be grateful if you could sort out the terrible problems you have in maintaining our submarine fleet, about which we have received many complaints, including from senior officers in the Royal Navy. Good luck on Type 31, but could we do better on submarine maintenance, please?

**David Lockwood:** We are endeavouring to return them to service as fast as we can, yes.



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**Mr Francois:** That may be, but that is not what the Royal Navy tells us, believe you me.

**David Lockwood:** Okay.

Q68 **Mr Francois:** On the point about mine hunters, I declare an interest in that my father was on a minesweeper on D-day. We have a tremendous reputation among other navies. I think it fair to say that we are still regarded as first class in mine hunting. The Americans rely on our Op Kipion-deployed mine hunters in the Gulf, to keep the straits open in the event of a crisis.

All this new tech is great but, if this does not work out quite as well as you all seem to believe that it will, is there not only a serious risk to the ability to conduct maritime operations, but serious reputational risk to our relationships, not least with the United States navy? I am not accusing you of complacency, but we would like some acknowledgement that there are military and reputational risks if we do not get this right. Let's start with Babcock but I am also interested in the other two perspectives.

**David Lockwood:** We are probably the least involved of the three witnesses, but I agree. As Sam said, the Navy owns the risk-reduction plan for the introduction of all technologies, and this is a particularly important one. I guess Sam knows much more than I do about that.

**Sam McBriar:** I am happy to add to that. Yes, we acknowledge that important risk. You are right. That is why there has been a development programme that has looked very carefully at risk and how we can mitigate that; how we can test how the systems are going to operate and then prove it in service; then a very rigorous set of sea trials that include four or five real military scenarios to run through. That is all before we go into the production phase.

There is a lot more to do, obviously, and we have had visitors from many nations, including the US, coming to look at the technology, interested in how it's going. I absolutely acknowledge that.

**Glynn Phillips:** I agree and acknowledge the risk that you highlight. I don't think anybody takes that lightly, least of all the Navy. I think they wish to retain the world-class position they have in mine hunting. As Sam said earlier, I don't think it will be a move from one to the other; it will be a transition that hopefully manages that risk, to make sure that it doesn't materialise. You are absolutely right—that is the risk, and it will need to be actively managed across defence and industry.

Q69 **Mr Jones:** If we return to Type 31, there is no getting away from the fact that it has been procured and it has been built, but it is more about filling the gap in terms of a political decision on the 19 destroyers and frigates. At the end of the day, it has limited capability. I keep hearing this issue around exports, but we all know that the market is very competitive; we've got alternatives from the Italians, the French, and others who are in the market already.





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I have seen no evidence that this stop-gap ship, which we are procuring, for obvious reasons, with limited capabilities, is exportable. I have talked to European colleagues and I am not aware that people are clamouring to buy it, so shouldn't we just be realistic that it is a stop-gap for a certain period of time? It fills the order book, but in terms of deluding ourselves that we are going to export it around the world, that is actually for the birds.

Frankly, no one knows what the Type 32 is. Again, it is another bit of spin from the MoD to give the impression that the political decision about the 19 frigates and destroyers is not going to be breached. Anybody?

**David Lockwood:** I will go on the export campaign. Last week, we were supported in Greece by the First Sea Lord and the Minister for Defence Procurement. I have been there; I would say that the Greeks see us as very serious contenders. We currently have people negotiating in another country, which we can't mention, so I am not sure I agree with you. We will see.

Q70 **Mr Jones:** If it is Romania, I was there—I don't think you are top of their list.

**David Lockwood:** It certainly wasn't Romania, no.

Q71 **Chair:** Thank you, Kevan. Turning to the risk register for a couple of the ships, first the Type 26, Glynn, could you tell us what is on the risk register for that ship?

**Glynn Phillips:** The principal risks, as with most first of class ships, are finalising design maturity to make sure that it meets the design intent; making sure we have the fully-mobilised supply chain to deliver against that; from a build and commission perspective, it is making sure we drive those programmes to the committed timescales. Then it is how we enable the Navy to move from when we deliver the ship to how they get it into service. Those are probably the primary risks.

Q72 **Chair:** Any gear box issues?

**Glynn Phillips:** Yes, we have had historical gear box issues. Again, we have a first of class gear box, newly designed for the platform. It is a fundamental part of the air strategy platform; it has to deliver certain acoustic sensor requirements to make sure that the ship is silent. It is an integrated part of the platform mission, not just a propulsion system. It is a first of class and has been designed to an exacting specification and there have been challenges in demonstrating that we can meet that design. We are through the majority of those now, we believe. We have tested the gear box on the rig, or the supplier has, and we are going through the final trials testing now. We are currently confident that we have a good gear box that will meet the specifications, and we will be able to demonstrate that through trials before we put it into the ship. Clearly, once you have put it into the ship, it is a big evolution if you wish to make any changes thereafter. It is a matter of making sure that it is right and will deliver the mission intent.



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Q73 **Chair:** Okay. The propulsion systems that we saw affect the Type 45, have you learned from any of that to make sure that the Type 26 isn't haunted by the same experience?

**Glynn Phillips:** Yes, the lessons have been learned. Clearly, there were lessons to be learned from Type 45. They were probably different on that platform in terms of the way the overall propulsion system was developed to meet that platform's mission compared with that which is on the 26, which is more about stealth and silence. On the 45, it was more about power and resilience. But the lessons, where they are appropriate, have definitely been learned.

Q74 **Chair:** Thank you. David, on the Type 31, same question for you connected to the risk register, please.

**David Lockwood:** A lot of my points are similar to Glynn's because it is first of class, but obviously the Clyde has been building warships for a long time without a break, and we haven't. We have got the start-up risk and also what we call the digital dockyard approach. We are introducing a lot of tech into how we gather data in the production. We talked a lot about tech on the platform—this is tech in building the platform—and all that is obviously being commissioned for the first time. I wish it was known when we started that everything is on plan and we are having independent reviews but that is obviously a big issue to make sure that we stay on top of. The integration of the combat system working closely with Thales with first of class is always something that you need to get right. That is going really well in a joint board, but it is not done until it is done.

Q75 **Chair:** You are calling it the first of class, but isn't the hull based on the Iver Huitfeldt class, the Danish ship, which has been around since 2012, I think?

**David Lockwood:** It is, but we digitised the entire data pack as part of this digital factory. That required certain updating for engine changes and other things, so there is still all that. Even a small amount of change needs to be properly managed, so all that needs to be managed through interproduction.

Q76 **Chair:** One thing I did ask is why the Type 31, this next generation of ship, which will be around for a couple of decades, cannot upscale to have two rotary systems, two helicopters on board? When I asked the Navy this, they just said, "We don't do two helicopters. One is traditional, that is what we use." Yet we know that 95% of the time our ships are not doing the high risk, low probability events; they are actually doing more mundane events—humanitarian support, littoral, or indeed force presence. There may be occasions when you require two helicopters. Did you consider lengthening the deck even just slightly so you could on occasion, such as in the Caribbean when we are helping out with hurricanes, upgrade to two helicopters?

**David Lockwood:** In the end—you asked the question about the engagement—in order to run a fair competition we all respond to quite a detailed spec, so you get to comment on it. But you are never going to



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change a spec to that extent, post competition, because the loser would appeal for a start.

Q77 **Chair:** And the same with some form of ramp at the back to allow marines to roll off their rigid inflatables.

**David Lockwood:** Same; that wasn't in the spec.

Q78 **Mr Jones:** This comes back to the fundamental question I asked about Type 31. I don't think it is down to Babcock or somebody else to change the spec once they have got it. I agree. But this was just done to fill the programme. Its usefulness to the Royal Navy will be limited. It can't do NATO tasks; it has no air cover fitted, and I just think that before we start going off into Type 32s, the Navy needs to start asking a question about what it actually wants, rather than just trying to fit the 19 frigates and destroyers. The 19 frigates and destroyers are fine but, if you can't use them for most things you want to do, they are pretty useless.

**Chair:** As I said earlier, I don't think 19 frigates and destroyers are now enough, given the constant competition that we face.

**Mr Jones:** It would perhaps have been better if we'd stuck to the original figure for Type 26.

Q79 **Chair:** No doubt. The "e" in Type 31e stands for export. That is still the same. Can I ask, David, how many are you exporting?

**David Lockwood:** We are not exporting, because we are only just in the position to start export campaigns. We are involved in five live export campaigns.

Q80 **Chair:** Can you share, or is it confidential?

**David Lockwood:** The obvious big one is Greece, because that is the one that has been most heavily supported by Government and the Navy, but also Indonesia and Poland. Those are the big three frontrunners.

Q81 **Mr Jones:** Who are your main competitors? From what I've read, you haven't even started in some of those countries, when you look at the competition you've got from other frigates that aren't new concepts but are actually in the water and serving navies.

**David Lockwood:** Sorry, I didn't hear all of that. I lost the middle bit.

Q82 **Mr Jones:** You have got existing platforms from countries producing frigates that are already operational with navies. It is a very competitive market. I want to know who you are up against in those markets. In places such as Greece, the Germans will obviously be very competitive, as will others. Shouldn't we be realistic about Type 31e? If we can export one or two—fine—but the 40 mentioned that were going to be exported is a figure plucked out of thin air.

**David Lockwood:** I don't know about 40. That's the first time I've heard 40, to be honest.

Q83 **Mr Jones:** It was in the original shipbuilding report.



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**David Lockwood:** In terms of being price competitive, flexible and modular, the responses we have had, not just from potential customers but potential industrial partners, have been positive. Yes, it is a very competitive market, but we have set a new price point by implementing the strategy that Sir John started.

The flexibility we have given means that customers can choose both how to start and how to grow the platforms. Working with people such as Sam and the Thales team, for example, in Greece, they can offer an ability to enter at a certain price point and then grow the capability in a way that is quite modern and competitive. I am much more optimistic than you are. I hope I am right, but I am much more optimistic.

**Chair:** We certainly wish it well. With the phenomenal growth of autonomous vehicles—land, sea and air—you are going to need a bigger deck to put those things on. Let's turn now to Thales, Sam, and focus on Crowsnest.

Q84 **Mr Francois:** Ms McBriar, what is the current status of the Crowsnest programme?

**Sam McBriar:** Crowsnest is currently deployed with the Carrier Strike Group. It is there with the group, with the assets. We have had feedback from the squadron out there, and they are pleased with how it is performing. That is where it is currently.

Q85 **Mr Francois:** Thank you. How many years late did the system enter into service?

**Sam McBriar:** It was late—we acknowledge it was late. It was a very difficult programme for all involved in it.

Q86 **Mr Francois:** My question was, how many years late?

**Sam McBriar:** I don't know precisely how many years late.

Q87 **Mr Francois:** It was quite a lot of years late, wasn't it? There were very complex contracting arrangements. I think you had a number of different contractors involved. Who was prime? Lockheed Martin were involved, Thales and Leonardo. Was Lockheed Martin the overall prime, or was it Thales?

**Sam McBriar:** Lockheed Martin was the prime on the Crowsnest programme.

Q88 **Mr Francois:** Where did Thales and Leonardo come in?

**Sam McBriar:** Thales was responsible for the radar, and Leonardo for the platform. Obviously, there are interactions between all those systems in terms of responsibilities.

Q89 **Mr Francois:** Yes, but Leonardo, which used to be Westland in old money, was responsible basically for the helicopter. Your radar was going to be integrated on to it, and Lockheed Martin was the prime and had overall responsibility for delivering the programme. That is what a prime



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contractor means. That is correct, yes?

**Sam McBriar:** Yes, that's right.

Q90 **Mr Francois:** We don't have Leonardo or Lockheed Martin here today, but we do have you. The programme lost over a year, according to media reports, because the Merlin helicopter that was assigned as the test vehicle was left out in the rain for over a year to rot and was not painted properly. Can you shed any light on that?

**Sam McBriar:** No, I don't know about that, I'm afraid.

Q91 **Mr Francois:** Well, it's true. The actual helicopter that they were going to use was basically left to rot for a year. That is just one of the reasons why the programme was so delayed. Then people wonder why we on this Committee sometimes get a bit irritated with the performance of defence contractors. At the end of the day, this is taxpayers' money, isn't it? It is not just off the magic money tree. Other than leaving a helicopter to rot in the rain, what other things went wrong with Crowsnest to delay it so badly?

**Sam McBriar:** It being a complex systems programme, like we all deal with in this industry, there were many risks and opportunities to manage. We put all the resources necessary to deal with that on to the programme. We appointed a vice-president from the group to run the programme and took that commitment to the contribution of this to military capability very seriously. We acknowledge that the programme was late and, as colleagues were talking about earlier, lessons have been learned and implemented. In terms of details—

Q92 **Mr Francois:** Forgive me—"Lessons have been learned." This Committee has been doing a parallel inquiry into the defence industrial strategy. As part of that inquiry, we learned that the MoD has had 13 reviews into defence procurement and what has gone wrong with it, dating back to the original learning from experience report in 1986—I think that was the first of the 13, but I would need to double-check. Anyway, there has been a baker's dozen of reviews, and everybody says that lessons will be learned. Forgive me, but you hear that mantra remorselessly, and yet we still have all these disasters. We have had late programmes, overspending, Crowsnest and A400M; we have touched on Astute already, and there is more news today on Ajax—it just seems to go on and on. What guarantee, if any, can you give this Committee that industry really is learning, because, with respect, those words ring hollow?

**Sam McBriar:** From my perspective, I see it going into the next programme in terms of the way that we de-risk things and implement and invest in activities that will support the programme staying on track. We have a complex industrial landscape in this industry. We have skills challenges. We have challenges in sustaining systems that need to be sovereign, where we need to be cognisant of decisions made about whether things are done in the UK or not. All of those come into play



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every time a complex programme is conceived and needs to be delivered, and we need to work together on those challenges.

- Q93 **Mr Francois:** Hmm. So as not to delay matters, could you provide the Committee with a detailed note about why Crowsnest was so late—not just about Thales’s role in that, but also maybe Lockheed Martin’s and Leonardo’s? Could you give us, if you like, an overall summary of what went wrong and why in writing?

**Sam McBriar:** Yes, I am happy to write in with that and provide those details. I think that is the right thing to do.

- Q94 **Mr Francois:** That would be extremely helpful. For reasons I won’t bore you with, could we have that within the next 10 days, please?

**Sam McBriar:** Okay.

**Mr Francois:** Thank you very much.

- Q95 **Mrs Lewell-Buck:** Apologies for my late arrival today, Chair. Good afternoon, everyone. I am speaking as someone who comes from a family of shipbuilders. I absolutely want our ships to be built here, but, as you know, shipbuilding in the UK seems to take longer than for similar vessels in, say, Japan, Taiwan and Holland, so what are the particular challenges that we face that foreign yards do not? I will go to David first.

**David Lockwood:** If we look at the pacing of the budget—something that Glynn and Sir John have talked about—I think five years for first of class is pretty competitive with when FREMM came out in France, for example, so I am not sure we are a million miles off. As Glynn said, BAE Systems have been at this longer than us, so he has more track record to talk through. The big place where we use lots of time is from concept to getting under contract. That is where we have a very long time period quite often, but Glynn is probably better placed to comment than I am.

- Q96 **Mrs Lewell-Buck:** Can you expand on that, David? Concept to contract—what is the problem there? Why is that taking so long?

**David Lockwood:** Well, of course on Type 31 it didn’t, as Sir John said. It was his recommendation to move fast, and we did. In the ship we are building, it did not, whereas Glynn is the one who has the most recent experience in 45 and 26. That is why I suggested that perhaps he might be able to answer more accurately. I am in danger of speculating on why those took a long time to get under contract.

**Mrs Lewell-Buck:** Okay, the floor is yours, Glynn.

**Glynn Phillips:** I think the challenges are around how you close out the requirements set in a timely manner. You go through a series of cost capability trade-offs to make sure that you get the optimum capability for the Navy for the optimum price and schedule, so there is an optimisation and trade-off across those areas. Across the enterprise there are always challenges in closing some of those out, because once you close them out they tend to be locked in and technology moves, so people feel maybe



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they could introduce this technology now. It might take a bit longer, but we would have a better capability. There is a whole series of factors.

I know that, around 26, there was a lot of activity around, first, ensuring its acoustic performance. Secondly, there was, at that time, a very clear ambition—hence the name, the “global combat ship”—to make it exportable. There was a whole series of iterations from how we make the platform meet not only the UK requirements, but also with a view to being able to export it, albeit that that was probably 10 years hence, so those decisions probably stood us in good stead to be successful in Canada and Australia. It is normally a complex web of things that means it can sometimes take longer to get to the final design requirement, settling on that, and, as David talked about, then not changing it.

**Mrs Lewell-Buck:** Sam, did you want to add anything?

**Sam McBriar:** No.

Q97 **Mrs Lewell-Buck:** Okay. Sticking with David and Glynn, can you remind me when the Type 26s and the Type 31s will be operational?

**David Lockwood:** The first vessel acceptance for 31 is in '25. We start doing contractor trials before that and then Navy trials, but acceptance is contracted in '25.

Q98 **Mrs Lewell-Buck:** Glynn, what about the Type 26s?

**Glynn Phillips:** Type 26's operational “in service” date is determined by a series of factors. The Navy has declared an “in service” date in the mid to second half of the decade.

Q99 **Mrs Lewell-Buck:** There are different timescales. Can you explain what the different timescale for them are? Why is there a different timescale for both programmes?

**Glynn Phillips:** Type 26 is probably a more complex platform, designed from scratch, compared with David's platform, but I will let David comment on that. It also takes into account the period the Navy want from when we deliver the ship to where you bring other capabilities on to the ship that they would wish to deploy. Also, the “in service” is driven by a whole series of issues, including training, infrastructure being ready, and facilities. A whole series of things need to come together to be able to make the ship operational, and that tends to come together after we deliver it—they are brought together by the Navy. They drive a certain timescale as well, as to when they can trial and hand the ship over operationally.

**David Lockwood:** An ASW frigate is just more complicated to accept and then deploy than our frigate, which can essentially operate autonomously and be deployed, conducting its mission. It's a different role and a different complexity in acceptance.

Q100 **Mrs Lewell-Buck:** I am struggling to try to get a practical picture of what this looks like at the outset. I think Mr Ellwood may have touched



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on some of this with members of the earlier panel. At the point where you have the discussions with the MoD is there not forward planning for all of these things factored in to that contract? It seems that things are constantly moving and changing throughout a contract's timeframe. Is there any way of getting better at that? Is there any way of mitigating the constant changes and movements in the contract, or not? I don't know, but you might.

**David Lockwood:** We set out, when we got under contract, to minimise that, so we have got not just years but exact months when things are due to happen. We now have the acceptance programme for ship 5, not just ship 1, laid out so we know what we are doing now, because the whole acceptance for us is simpler than it is for Glynn. Ours is simpler—there was a great deal of effort by people in Babcock and people in the MoD to take the learning of this kind of acceptance, and build a plan that takes us all the way through for all five ships. That does exist for us.

**Mrs Lewell-Buck:** Glynn?

**Glynn Phillips:** I think it is fair to say as well that a long period between concept and capability is not always a bad thing. In terms of starting conceptual options early, we are, along with Navy and Defence, already looking at concept designs for the replacement of the Astute programme. The Navy are going through the concept designs for the Type 83, which will ultimately replace the Type 35. Actually, left-shifting some of those things is actually a positive to make sure that some things are in place, so that you may go slower in front and go faster in the middle and the back. It can be a virtue as well.

Q101 **Mrs Lewell-Buck:** We are talking about a lot of public money here. Pardon my ignorance, but are the penalties in the contract imposed if you don't deliver, and are the penalties the other way round if the MoD keep moving the goalposts?

**Glynn Phillips:** I will speak for my contracts. Each contract has different conditions but, yes, invariably there are a mix of them. If you take the Type 26, yes, there is an incentive and penalty regime for both parties. It is a joint programme.

**David Lockwood:** We have a penalty regime.

Q102 **Mrs Lewell-Buck:** In terms of moving the goalposts and changing the specifications, would outsourcing to any other shipyards help to overcome any delays, or would that just increase delays? Would that be beneficial, or not?

**David Lockwood:** We haven't had any change. I think, in general, the more complex you make the build arrangements, the more difficult it is to manage change.

**Glynn Phillips:** I would agree with David. Depending on what some of the challenges may be, just outsourcing it is not necessarily a solution. A lot of these things are integrated solutions between the platform and the design, and therefore doing them in-house is the best way to de-risk it. There may





certain elements that you look to offload, as we do across the UK supply chain currently. Probably 70% of what we do as a prime contractor is then transacted into the supply chain. It can be a solution, but it is not always the only solution.

**Mrs Lewell-Buck:** Thank you all very much.

Q103 **Chair:** Before we turn to the National Shipbuilding Strategy, Glynn, you have built two large aircraft carriers. How come there wasn't any UAV capability built into it?

**Glynn Phillips:** The first thing I would say is that the carriers were built in the aircraft alliance in which BAE Systems was a significant partner along with Babcock and Thales. I will be honest: I wasn't present in the initial requirements decisions as to why that was not considered. Clearly, the nature of the platform has a level of versatility that does not prevent that going forward as a capability. I am sure that there are ambitions—I know they are the ambition of the First Sea Lord and others—to be experimenting on the Prince of Wales as to how we trial and field some of those capabilities. There is, by definition, a huge platform, which is optimally designed to operate the F-35, but which equally can be in service for 50 years and will clearly have to be able to both integrate into the carrier task group and offboard assets that we talked about earlier and, equally, contribute with the large airstrip that it has and a huge hangar, which presents opportunities. I know that the First Sea Lord is very keen to be able to do that through what he has called the year of experimentation.

Q104 **Chair:** When I posed this question to the Royal Navy, they said, "Oh, we had too much on just to get the carrier right to fly F-35Bs off it." This is the latest aircraft carrier in the world, yet we didn't think concurrently that there are drone systems—Sea Scout is the one I have in mind—that use a simple catapult system to allow long-range recce, or other simple methods of utilising UAVs. Yet the world's two latest aircraft carriers don't have these capabilities. I suppose my question is: why didn't you nudge them? Why didn't you say, "This is what other people are doing. This is what you could have. This is where we could go"? I am really concerned about the decision making for what ends up operationally deficient when the capability is there today—not tomorrow, or in five or 10 years, but today.

**Glynn Phillips:** I think it would also be determined by what was the state of the art at that time, in the initial design phase, probably over a decade ago. The priority focus—clearly it was a challenge programme around schedule and cost as well—was to make sure it could operate the carrier task mission that it was there to do. I don't think it has shut off any future options, but as you say, it maybe did not incorporate any at the time—

Q105 **Chair:** But to retrofit costs money. We know that—it costs huge sums of money—and it often does not get done. The bow thruster on HMS Ocean broke and there was not enough money even to replace that, so we had to spend £8,000 on tugs to move it in and out. Unless you design and



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build it up front, it often doesn't get done.

**Sam McBriar:** I think it is an example of a focus on platform design foremost and not necessarily thinking about how the military capability will be generated and used in the future for the threat that can be perceived at that time. I think we need to learn some lessons from that, and I think things are being done a bit differently now, looking much more at concepts of operations and fleet integration challenges, and really trying to map that out and provide a road map.

Q106 **Chair:** About eight years ago I had a Westminster Hall debate on the Type 26, and I asked that very question: why are there no drones onboard? The Procurement Minister at the time gave me the answer—"We're looking at it"—but I wasn't getting anywhere. I had to get the Procurement Minister to go and see that film "Captain Phillips", about the attack by pirates on the Maersk ship off the coast of Somalia, for him to appreciate what the Americans were already doing today. About a month later he was very pleased to show me some fresh blueprints of the Type 26 that included drone capability. Much as I am delighted to have influenced the Type 26 design, that is not the way we should be doing procurement in this country, is it?

**Sam McBriar:** No, and let's not forget that the drones do not necessarily need to be housed on the ship. They can be housed somewhere else. The important thing is that they can be controlled and communicated with and can operate as part of that group, so it is not shut off in terms of integrating that capability into the carrier strike group.

Q107 **Chair:** This is my final question—I will give you each a minute or so on this. We have the National Shipbuilding Strategy. Can you quickly summarise the most critical ingredient you would like to see in that important document?

**David Lockwood:** I think clarity on objectives. We sometimes get into a discussion about the process and whether we are going to have competition or non-competition and so on, but the clarity of objectives would be really helpful.

**Glynn Phillips:** First, I welcome the publication of the shipbuilding strategy and the other artefacts. I would say, in addition to David's points, that this creates a huge opportunity to lay out a forward programme. Being able to see the detail of the equipment plan and the timeline we have talked about today will be absolutely crucial. Then it is a matter of making sure that Defence works together with industry to optimise the delivery of that programme. Delivery cannot happen transactionally on each programme; more continuous shipbuilding is needed if it is to bring together the ambition and outcomes. It is then about making sure it is funded and sticking with it. It's a long-term plan.

**Chair:** It is indeed. Finally, Sam.

**Sam McBriar:** The recognition of systems in the refresh must be strong. Recognising the export value of those in the road maps that exist with



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other nations and how we can collaborate with them is important. Once capability is gone it is lost, so we need to look at what we really need to do onshore. The skills challenges around the whole enterprise and the skills piece are really important.

**Chair:** That is very helpful indeed. We are not sure when the document will emerge, but I am sure we will digest it in due course.

ScanEagle was the name of that UAV capability that I was thinking of in that film, "Captain Phillips", which again is an incredible bit of kit—something that could easily be used on our carriers today or indeed on any of our frigates or destroyers.

I thank Sir John Parker and Ian Waddell for joining us earlier in the first panel, and I thank David Lockwood, Glynn Phillips and Sam McBriar for joining us latterly. It has been a really informative afternoon. We very much appreciate your time, energy and expertise in helping us understand where things must go for British shipbuilding, which we all want to see advance. That brings to a conclusion our Defence Committee hearing today