



International Relations and Defence Committee

Corrected oral evidence: Defence concepts and capabilities: from aspiration to reality

Wednesday 13 July 2022

11 am

Watch the meeting

Members present: Baroness Anelay of St Johns (The Chair); Lord Alton of Liverpool; Lord Anderson of Swansea; Baroness Blackstone; Lord Boateng; Lord Campbell of Pittenweem; Baroness Fall; Baroness Rawlings; Lord Stirrup; Baroness Sugg; Lord Teverson; Lord Wood of Anfield.

Evidence Session No. 16

Heard in Public

Questions 113 - 122

Witness

[I](#): Professor John Louth, Director of the Defence, Industries and Society research programme at RUSI (2011-19).

Examination of witness

Professor John Louth.

Q113 **The Chair:** Good morning. I welcome to this meeting of the International Relations and Defence Committee in the House of Lords Professor John Louth, director of defence, industries and society research at the Royal United Services Institute for a long period between 2011 and 2019. Thank you for joining us today. We are also hoping to make sure that the IT enables our other witness, Professor Matthew Uttley, who is professor of defence studies at King's College London, to join us. At the moment, there are some technical issues, but it means that we have the pleasure of being able to put questions to you, Professor Louth, on your own just for the moment.

Thank you very much indeed for coming today to contribute to our committee's inquiry, "Defence concepts and capabilities: from aspiration to reality". At this stage, I always remind our witnesses, and of course members, that this process is broadcast, it is on the record and it is transcribed. I always remind members in advance that if they have any relevant interests to declare they should do so when they ask their questions. When members ask questions, they may wish to ask a supplementary related to it immediately after their first question.

As ever, I will start with what is always rather a general opening question before my colleagues go into a more focused approach. The Defence Command Paper outlines ambitious plans for the future of the defence of this country of the UK. In your view, to what extent does this vision align with current and projected defence expenditure? Do you consider that those plans are financially affordable and, indeed, technically viable? Professor Louth, over to you.

Professor John Louth: Good morning, and thank you very much for inviting me. As ever, you started with a very broad and complicated question. My starting point is to suggest that we need to review the command paper along with the Integrated Review itself and the Defence and Security Industrial Strategy. They form a holy triptych, if you like, of what we think the emerging defence posture will be for this country. There is a little bit of Kremlinology involved, reading between the lines of three rather complicated and very individual papers. From my perspective, those papers were written by different communities for perhaps different audiences, so there is a little bit of interpretation to be done here.

The command paper specifically hints very strongly at what I would describe as a dual posture. One level of requirement will be thinking strongly about our commitment to NATO and Europe and the European mainland rather than the expeditionary, invasion-led warfare that we have had for the past 20 years or so. Another level will be thinking about our contributions to the Indo-Pacific region.

From my perspective, they are two very different things and they probably require different force structures and capability elements. When

thinking about whether they are affordable or not, we perhaps need to think through what our priority actually is. Given this year, an awful lot of money, thinking and commitments have been tied to Ukraine and our contribution to Europe, but, of course, if you spend any time in Washington DC or in Canberra, as I do, there are still many folk, our key partners, who think about China more than Russia perhaps.

The first sub-question to your very broad question is: what is our priority? Different people answer that in different ways. On affordability, what was understandable but disappointing for analysts when they reviewed those three papers was the lack of overt spending commitment, probably with the exception of £6.6 billion for defence R&D in the DSIS, and not all of that was new money, of course. We had to wait for the spending review in 2021 to really see where the financial rigour was going to be.

I know you have heard from Professor Chalmers before. He has talked about and written about the distinct uplift in capital expenditure over the next 15, 20 years or so, but pretty much with flatline day-to-day expenditure. I suppose that now has to sit within the context of what happens next, and an expanding NATO inevitably will bring different training requirements, different concepts of operations and a whole host of challenges post Ukraine. Whether that financial settlement satisfies what we think we perhaps need to do post Ukraine is an open-ended question.

If we are serious about the Indo-Pacific, and, let us be frank, the South China Sea, the capabilities required for that are linked to hide and operations within the scenes of conditional military domains, and that is emerging technology. There is a lot less certainty associated with that technology and, of course, the cost of generating that technology.

There are a lot of unknowns, but I certainly welcome the uplift in capital expenditure from the spending review.

The Chair: Thank you very much indeed, and thank you for pointing out that there is a whole issue about priorities that will need to be discussed in some detail. That is certainly something the committee has been trying to elicit from witnesses. Thank you for that opening answer.

Q114 **Lord Wood of Anfield:** Thanks for attending this morning. I want to ask you about the relationship between the Treasury and defence policy. I should declare an interest, because I used to be a special adviser at the Treasury, but please feel free to be rude about the Treasury if you like.

How would you characterise the Treasury's approach to defence spending, in particular its concerns about the MoD being in charge of defence spending? Do you think that the traditional antagonism between HMT and the MoD is true or has been changing in recent years?

Professor John Louth: I would never be rude about the Treasury.

Lord Wood of Anfield: I will pass that back.

Professor John Louth: I will start with what I have always found a little curious, in that the Ministry of Defence and defence specialists typically think in terms of spend. We have just had a debate on how much we need to spend. That is an input measure, is it not? The Treasury tends to think in terms of effects, and across a broad range of public services our performance indicators are more tied to outputs, perhaps. There is a fundamental difference between those two things, and it has always been a little curious to me that in the conversation they almost talk past each other from that perspective.

There is a way of working issue here, it seems to me. If we go back to the smart procurement and smart acquisition reforms and the start of the modern programme of project management in the defence enterprise, in MoD we had a very strong pricing and forecasting group who loved data. We had a dedicated NAO defence team who spent a lot of time in the public domain and had an overarching education objective tied to them, as well as their support to review and holding departments to account. I think the Treasury team was quite large in the early years of smart procurement and smart acquisition. That has now shrunk, as you know perhaps better than me, Lord Wood.

All of that suggests that there is no kind of community of interest talking about numbers, data, the relationships between inputs, outputs and outcomes that perhaps we had in the past.

In part, to answer your question directly, the relationships seem to be getting better at a personal level but also at a gossip level rather than an analytical level, but you still get this tension. The Defence and Security Industrial Strategy was, in essence, written by MoD spads with some of their Treasury colleagues and one or two others. The command paper was very much a military leadership paper written by a small group accordingly, and the IR was the motherhood and apple pie paper.

So there is a still a tension perhaps in who is talking to whom between the MoD and the Treasury, but I would still like to see the return of specialist communities who can talk about this properly and sincerely, and get it out of political soundbites perhaps. That is not necessarily a return to the bureaucracy that we saw with smart acquisition, but we need a much broader discussion on these things, which are probably the key enablers when it comes to posture.

Lord Wood of Anfield: Thank you for that. From my experience, there are two or three sources of tension between the Treasury and MoD. One is the fact that the MoD has great access to No. 10 and constant contact between senior military people and No. 10, and that always makes the Treasury nervous. But I think the main problem is procurement, which you touched on there. The Treasury always has problems with large-scale, long-term procurement with all sorts of cost overrun possibilities, and they literally cannot account for it properly.

Are there solutions to this being thought about in, as you say, better communities of collaboration? Also, are there solutions in the realm of

more centralised, more professionalised, procurement, for example, that may take it slightly out of the MoD or makes the MoD partners in procurement with other people? Is that still being thought of? I know it bubbled under for a long time.

Professor John Louth: I think it is an active conversation, and there is an awful lot written about this in my world, but it boils down to a level of maturity perhaps. If we want certainty, we want to buy mature technologies. Those mature technologies in the defence context are typically out of date when they are first in service. If we want battle-winning technologies, cutting-edge technologies, we procure potentially at the lower levels of technology readiness levels. Within TRLs 1 to 5 there is significant uncertainty. We cannot say with any clarity that a piece of applied research or development will come into cost, because who can predict when the Eureka moment occurs?

We have always been slightly disingenuous with this conversation. It is almost like going to buy a top-floor flat in central London with a budget of £50,000 and then saying that the costs have overrun. There is just a dysfunctionality to that conversation. What I would like to see borrowed from other sectors is some of the procurements of capabilities in complex systems broken down to their component parts, so that we have a different way of thinking about how to integrate those technologies and supply chains than a large, massive programme with certainty of cost, maybe within a three-point envelope, and certainty of scheduling. That certainty is the enemy of defence procurement. That certainty will stop us fielding high-tech, battle-winning capabilities, but that certainty gives comfort when we are thinking about public expenditure.

Q115 **Lord Stirrup:** Good morning, Professor. You have already started to get into my question, which is about the MoD's ability to manage and to deliver programmes and projects to cost and time. You started to touch on some of the reasons why that is complex. Do you think the Ministry of Defence is getting better at it, and are there any significant improvements that you would like to see in its process? You talked a bit about approaching project management in a rather different way, but perhaps you could go into a little bit more detail on that.

Professor John Louth: I think the whole concept of MoD procurement is tied up in whether we think of defence capability as a set of purchases—so the MoD as a customer—or whether we think of the MoD and the military as integrated capabilities, some public, some private. I think the MoD has been getting better at procurement, although I prefer the term “acquisition and integration”, because I am very keen in all my work today that we no longer think of the department as just a customer and consumer. It has to be a much broader integrator of the women and men, the training, the capabilities and the equipment lines that will allow us to generate proper military effects, and that is much more than just being a happy shopper.

I think the department is starting to understand that, and the work it has done on the Tempest aircraft, for example, is really smart. It has spent

some money on a proper review of the market. That review was independently chaired by outsourced expertise; Brian Burridge chaired that. They kindly made me the deputy chair, but the point is well made that the review was external to the normal procurement processes. Tempest then broke down a range of applied research and development opportunities, key enabling activities that were different from the way we would normally think about a major capital programme.

The other shift perhaps is when the department started to think properly about an effective, complex enterprise programme of project management at the beginning of the smart acquisition period. There was a strong emphasis on very clear requirements—requirements from the government perspective and requirements from the system technology perspective—and they typically needed to be pretty mature before money would be released and officials and political leaders would sign off. That is less so now, and I think that is right. If we are going to integrate the mature and the emerging, if we are going to think about proper military effect more than just platforms, we have to start to feel much more comfortable with working with the unknown. I fully accept that we cannot just give folk a blank cheque to do some good thinking and experimentation, but having applied research and development bounded properly in defined capabilities and significantly executed with smart oversight is the way to go, and with programmes like Tempest or emerging programmes like Tempest, we are starting to see that.

There still needs to be the strong reset, though, on what we do with performance, and the historical narratives of cost overruns and schedule overruns clearly do not help. All I will say, and I mean this with significant respect, is that these programmes can be 20, 30, 50, 70 years in the running from concept through to disposal. To keep talking about the cost overruns and the schedule overruns of, let us say, the Astute programme does none of us any favours. We need to elevate the domains a little bit and accept that there is still a long way to go. I think we all need to accept that, but it is probably better than it was, and from my perspective as an outsider and an analyst, the department and the Treasury have taken the right steps so far.

- Q116 **Lord Stirrup:** You spoke earlier about the challenges of bringing cutting-edge technology forward into front-line capability and the way that drives uncertainty, particularly over costs and timescale, but that technology of course can come from all sorts of different areas, not just from the MoD's own research programme. I want to ask you about the culture within defence. Is it agile enough, is it innovative enough to find different new ways of doing things and to look at different solutions rather than just driving forward like a super-tanker down a single path?

Professor John Louth: I think the honest answer is nowhere near enough. That is probably tied to the speed of technological change that we see now. This moment of high modernity is like nothing we have seen before, it seems to me. Also, for a while we had a strong sense of what the defence industrial posture and the enterprise looked like, but much less so now. With the complexities of supply chains, the multiple lines of

code that we need in our current and future capabilities, for example, that has to be sourced from a whole range of places and spaces that we do not have a really good handle on, and we need flexibility with regard to those emerging elements. Artificial intelligence, for example, is used heavily in oil and gas. It is used less in defence, but it will be used much more in the future. Artificial intelligence will be right at the heart of our defence posture over the next 20 to 30 years.

That network of capabilities is being drawn from a whole range of spaces—from universities, from private capital as well as the large defence primes—so the agility needed to get all that to work together at the earliest possibility is significant, and, dare I say it, it is very difficult for programme or project managers to do that effectively if they have been educated only in linear processes. That horizon scanning on our own practices of how we do programmes and projects is critical, and that probably means that defence has to open itself up even more to external engagement and external scrutiny.

- Q117 **Baroness Blackstone:** Could you elaborate for the committee how UK defence spending could deliver optimal strategic effect? Are there some areas where the outcomes of investment are strong, and perhaps even need to be increased, and other areas where the outcomes are relatively weak and where it might make more sense to withdraw or at least reduce our commitment to that particular area?

Professor John Louth: Thank you. That is a significant question, but I would always start with what we wish to achieve. That is a political decision, a political statement. Again, with respect, that has been poorly articulated politically. To say that we want to be safe and happy is silly. We need to be able to articulate what we want to achieve in an overt way so that we can match notions of required effects and therefore capability. We have been very bad at doing that.

If we want to achieve what in my language is dual posture—the ability to reach into the Indo-Pacific area and be beyond home waters, and to enhance global security through our relationships with the US and the Australians, principally in the maritime context—that is one thing. If we want to be able to contribute to operations in Europe and thereby, through those operations, be able to deter Russia so that we do not need to operate, that is another thing. To my mind there is a lot of work to be done here. It is for the political class to articulate what we want to achieve in our defence and security beyond happiness and safety; that is not good enough.

If we are serious about the Indo-Pacific, and I think we are, we need to understand that a lot of the anti-access and area deniability capabilities, so that we do not lose large major assets as soon as they hit the South China Sea, need to be invested in. As I said earlier, things that can hide, things that cannot be detected, perhaps things that can swarm, things that look significantly different from an aircraft carrier or a fleet support ship are critical. Of course, a lot of those things are at the lower end of the technology readiness level. The commitment of the £6.6 billion into

defence R&D and repurposing some of the moneys that are already there into some of these things is important. As Baroness Blackstone articulated, that means being able to decide what things we allow to drop off.

On the Indo-Pacific, are we thinking now or are we thinking 30, 50, 70 years down the road? It is not a glib question, because if we are thinking of the latter, think of the size of China four generations away from now and then compare that to maybe the population in Australia. These are not insignificant things to think about. The scale of Chinese GDP with such a significant uplift in its population should make us all wonder a little bit before we go steaming into the Indo-Pacific.

Secondly, given my concept of duality, if we are thinking of Europe, that is a manoeuvre war, and we have seen that in Ukraine. General Ben Hodges, who gave a lot of evidence to the Defence Committee a few years ago, commanded the US in Europe and was adamant about the boring old things that we had forgotten: the ability to manoeuvre at speed, the ability to reinforce, our ability to know things such as a bridge tolerance—will the bridge take an armoured personnel carrier?—our ability to understand whether rivers can be passed, what happens with tidal rivers such as we see in northern Europe.

All of that is critical information, and it is expensive information to secure. In NATO, we have had the joint analysis and lessons learned centre in Lisbon that, during the Cold War, was by anybody's definition a centre of excellence in the knowledge and the intelligence that could be applied to Europe. I think it is reasonable to suggest that that is less so now.

All of that perhaps needs to be recapitalised, and that is a sense of decisions required up at NATO level of who is doing what. Our experience of NATO has been an extremely nationalised one: that the nations do their own thing. I have spent quite a bit of time at SHAPE over the past few years, and you would perhaps characterise the supreme headquarters as a place where senior military from the nations act as their military ambassador rather than generate a proper integrated command structure. All of that needs to be reworked and rethought, and it is expensive.

Lastly, NATO and Ajax aside, our ability to manoeuvre is critical, but so is the ability for our Polish or German colleagues to operate the equipment that we provide, because a lot of our men and women will be dead, of course, if we fight. The idea that the capability sits empty if we lose troops is a bit foolish. A completely different approach to NATO training is clearly required if we want to have that force of manoeuvre to deter that we perhaps need post Ukraine.

Baroness Blackstone: You have answered at considerable length but, very briefly, you mentioned in this duality that you have been talking about throughout your answers that we have to work with NATO and with the Americans, the Australians, and so on, but I wonder whether we

should be collaborating more rather than duplicating in both these contexts. If you take R&D or training as an example, are there areas that we should be dividing up with our allies, not each of us trying to do everything?

Professor John Louth: I could not agree more. That is absolutely the point. In the UK, coming to competition next year, we will have the collective training transformation programme for the Army. That is a wonderful opportunity to think how land forces train collectively across our alliance bases.

If we are thinking about technological collaboration, whether we like it or not, a lot of that occurs in the private sector and in areas of research that have an applicability to defence. Rethinking how we fund some of that private sector collaboration would be useful to us, and I am very conscious of the potential to exploit our Brexit freedoms, dare I say it. We could think through the UK Government taking a stake in some of the younger, technology-rich businesses that have a pathway to international collaboration that perhaps we could exploit more effectively.

Q118 **Lord Teverson:** Moving on to defence procurement policy, which we have been talking about a fair bit already, when I read the papers I was quite shocked to read that from 2021 to 2031—10 years—we are expecting to spend £238 billion on equipment to procurement, which is a large amount of money. I sometimes feel that, outside the Ministry of Defence, when we talk about increasing defence expenditure we are too aware of all the problems that there have been and whether that money is well used.

Is there an optimal balance between bespoke developments and off-the-shelf purchases in defence procurement, or is that a very naive way of looking at these things? What are the associated considerations in how we would prioritise them? Do defence capabilities need to be supplied by the state itself or can they simply be sourced from private suppliers? What could we not just buy from abroad anyway? Do we need to develop anything in this country? Why do we not just go out and buy the best there is?

Professor John Louth: That is a very broad set of questions. I would answer them in a couple of ways. First, this notion of no development, national versus international purchase or off the shelf does not match the reality of the complexity and challenge of integration across our capability packages that we are seeing. Even if we can say that something is national, we can pretty much guarantee that a significant amount of it—components and content—is global. We will change and be remarkably amorphous as their upgrades are generated. Even the national is international globally.

We need to think through what off the shelf means when it comes to our local development. I am not just talking about the prosperity agenda, I am talking about our resilience. It is really good to have women and men who understand the complexities on our island. If those women and men

are in other places and spaces, they may not prioritise us. I am always a little conscious of the affordability/off the shelf argument, but the challenge with it is that we potentially lose some of the core competencies of knowledge and skills that we really quite value in the north-west and Bristol area, and so on. What is a UK business? Lockheed Martin, as an example, is headquartered in the US and is a major part of the US defence posture, but I think most people who work for LM in the UK would regard themselves as quintessentially British in a British-registered business. That sense of where the company ultimately resides has become less and less over the years.

We need to move away from the binary and into notions of how we best manage complex systems. That is not an easy transition to make, for the reasons we discussed earlier. Taken head on, could we outsource everything? In logic, yes. But we do not live in philosophy departments. We live in the real world. In logic, we can outsource everything to the People's Republic of China. In reality, we probably could not. We need to have that mature debate about who we want to be in our defence enterprise. Do we want all contractors even generating some of the lethal activities that we probably have to undertake? Do we want that to be subject to women and men in uniform? I know where I would be, but it is a broad debate.

Back to my earlier point, some of these things are quintessentially political and need to be debated politically. But if we are signalling whether we want the commercial private sector to move into the military spaces, it has demonstrated over the years that it can do that. In the first Gulf War in 1991, pretty much everybody was in a military uniform, with one or two exceptions. Move forward to the surge in 2006 in Afghanistan and it got close to 50:50, if you include the locally employed contractors. That happened over a generation—over 14 or 15 years. I do not recall any active political debate on it.

Q119 Lord Teverson: A House of Commons research paper on defence procurement said that one of the core problems was that programmes were long but that the people who managed them were on a much shorter timescale—you had a number of project managers from a particular procurement programme, for example. Another way in which it is perhaps logical to share development between allies is that as soon as you start involving other partners, decision-making almost becomes impossible and the benefits are lost. Could you comment on whether those problems are soluble or whether there are other lessons that we could learn? Lastly, we always know about the disasters in defence procurement. Perhaps you could give us a few examples of where it has gone completely right.

Professor John Louth: Absolutely. If we were in a business school, we would probably be thinking about the division of responsibility between shareholders and managers. Managers are short to medium term by definition. Shareholders are there for the long term in certain areas. I have always found that in businesses that are perceived as more successful than the demonstration of progress, the returns on investment

and the recovery when things go wrong are pretty much shareholder-driven rather than managerial.

I wonder idly whether a lot of our complex programmes and projects and the sub-activities within them—the sub-programmes and projects—should be banded differently, so that we have much more long-term rigour in how those are demonstrated as being on track. That is not a complicated thing to do. We have seen that in other sectors, it seems to me. Maybe getting away from this notion of defence exceptionalism would be useful, and the time may be now. If our societies work in many ways, why not apply that to defence. That kind of public/private split is probably the right thing to start thinking about.

With successes, the biggest and most obvious one to speak about but which very few people know about or have access to is deterrence. Deterrence is an incredibly complicated thing to do. We are, day by day, successfully putting hundreds of folk together with things that should never be deep in the water. We are running a complex supply chain that involves the US, which reaches back over a quite wide ocean. Our ability to store and make safe materials and the deep knowledge that we have in this country on integrating those capabilities to generate our deterrence posture is phenomenal. With one or two blips over the past 70 years or so, that has been pretty well run.

I think back to the capability sustainment programme for Aldermaston a good few years ago. That was all in the public domain. That was a sizeable sum, but what was required was delivered to time and to cost. A lot of what those folk were doing was innovative at the lower levels of the TRLs, and I wonder whether defence did not learn wider lessons from that programme because of what it was. Looking at that would have been smart.

Q120 Baroness Sugg: Sticking with procurement, we saw in the Queen's Speech the Government's plans to reform and streamline public procurement across lots of departments and to replace some of the regulatory regimes, including the defence and security public contract regulations. That is going through Parliament at the moment as part of the procurement Bill. I would be interested in your thoughts on the Government's defence procurement policy so far. Do you think it needs to be reformed, as the Government are attempting to do through the Bill? Do you think the Bill addresses current and future challenges?

Professor John Louth: I am almost at a loss. I have tried to read as much of this as possible, not just for today but for the book I am writing on defence exports. It is hard to identify the end state that the Government are looking for here. They are looking for reform, for things to be better, but in what context? Seeing it as an attempt to streamline some of our processes and practices now that we are out of the European Union makes sense analytically, but I understand what the end state is.

What I was hoping for, I must be honest, was a revised Act of Parliament for public procurement—specifically defence procurement—that thought

through how we intended to share the risk in generating those capabilities. What I was not necessarily anticipating was lines and lines of rhetoric and legalistic reform, because someone like me cannot access that. I know that is not an acceptable answer, but that is where I am. A lot of defence analysts and academics are struggling, as I am.

Baroness Sugg: Can you expand a bit on what you mean by the sharing of risk and what you would want to see in a procurement Bill from a defence perspective?

Professor John Louth: I can. We may need to start with the understanding that complexity has to be managed and integrated, and there is a role for sub-system procurement in that. If we are integrating technologies that are new or novel, and then typically based our life on the lower end of those development cycles by definition, quite often the private sector is best for forging through with that.

When we come to integrating some of those things with our current systems and things that we are procuring through the EP line, mixing what the private sector has done and is doing with what the state has done and what the state is providing as GFX would be smart for us and would help us enormously. That would give private equity and family wealth, and it is amazing how much family office wealth is tied up with defence SMEs. It is not talked about a great deal, but a lot of private wealth—some of it offshore, to be honest—is funding some of our defence research and some of the emerging capabilities. I am involved with a company. I sit on its board, and everything that it has done to date has been generated by private moneys, by family wealth. That is laudable. I think we would attract more of that if people knew where those emerging capabilities were to sit.

Blending what we have with what is emerging at a sub-system level and having this combined Government and private sector commitment to generating those would be helpful.

Over the next year or two, you will see a lot of things that have been developed and how a defence application in the UK will be exported and will not necessarily form part of our battle space. That may be desirable. We may have everything we need, but it seems to be a missed opportunity. Even if the Government were to be overtly involved for exports and had a stake in a defence export business, it does not take too many brains to work through what that would mean to local prosperity perhaps.

- Q121 **Lord Campbell of Pittenweem:** Since your background includes services to the Royal Air Force, I cannot resist the temptation to ask you about the future combat air system, which of course is a programme designed to produce a successor to the Typhoon. A number of members of NATO are combining together for that purpose. How do you think the United Kingdom should handle the challenges posed by the FCAS? In particular, I am sure you recall that when the F35 was first considered, we said that we would take 138, and so far we have taken, I think, 35.

Were we to purchase more of the F35, that would seem to me to be a possible way, or to have the possible consequence, of undermining the FCAS. What is your view?

Professor John Louth: I think that is true. The FCAS has been well managed so far. There have been justifiable criticisms here and there, but on the whole I think it has been extremely well managed and properly conceptualised from the department. The fact that it is homed in a rapid development office rather than being another line in the EP is important. There was recognition early on that part of the proposition needed to explore the size of the market for next gen aircraft was hugely valuable. That has driven the sense that we do not have a big enough demand ourselves to justify the vast development outlay that we will have, let alone the manufacturing and training complexities.

Thinking of this, a broad international collaborative programme is right, and where my head goes is that understanding where the intellectual property and a lot of that deep know-how resides is very important early on. I am getting more and more excited by the idea of having almost a non-national safe space for international collaborative programmes for their IP, so that it has a legal entity in its own right and perhaps can be provided to nations in a different way through a long lease and so on.

I am excited that the FCAS is starting to pick up some of those complicated commercial challenges. I am excited that a number of nations have committed to collaboration. I think it is mature that no single nation thinks that it can fund this itself for its own forces. There has to be significant focus on multi-nation use and on exports, and all that must be right. But we are back to where we were at the beginning; it seems to me understanding that complexity of integration is still key.

Q122 **Lord Alton of Liverpool:** Can I take you to the Public Accounts Committee report that was published in the House of Commons last month on defence procurement, and specifically to Ajax? The committee said that the delays to Ajax armoured vehicles "risk national security", that there had been a litany of failure and that the programme had been flawed from the outset. It ran for 12 years and cost £3.2 billion, but it failed to deliver a single deployable vehicle. The committee went on to look at 20 programmes at a combined forecast of £120 billion. In nine programmes, the costs had risen in some cases by 60%. Is that unreasonable criticism?

Professor John Louth: No, it is actually understated. Ajax will be an example of how this should not be done. One of the disappointments for me is that there was enough warning, but there was also significant sponsorship in different communities that were adamant that Ajax was what was required. I think most people looking in from the outside would probably have a different view. That is not to say that it cannot be recovered. It can, but it will cost money. Whether that money comes from the companies involved or from government, we will see. The problem, of course, is that if it comes from companies of old, they will not be using their applied research and defence budget on other things, and

that is disappointing. Either way, it is a disaster, and we need to learn from that.

The Chair: Thank you, Professor. Although the IT let us down in one respect, that one witness was not able to join us, we certainly benefited from being able to ask you even more detailed questions than we would have been able to otherwise. At this point, as we say goodbye to you for the moment, but we will certainly of course, as this is transcribed, have in our papers the Hansard record, which we can use later this autumn when we will be drafting our report. Thank you.