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Defence Committee

The contribution of ISTAR to operations

Eighth Report of Session 2009–10

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written evidence*

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Conclusions and recommendations

1. This Report can provide only a useful snapshot of the principal issues relating to the current contribution of ISTAR to operations and set down a few markers for the future. We have not had the chance to examine all the issues we hoped to address in this inquiry, but we hope that our successor Committee will continue to monitor this area. It is crucial not only to the success of the current ISAF mission but also to the future defence and security needs of the United Kingdom. (Paragraph 8)
2. We are pleased to hear that the MoD is now giving priority to improving the dissemination of information collected by ISTAR assets in theatre. The Armed Forces' capacity to process and disseminate information they receive clearly falls behind their capacity to collect. We commend the MoD for acknowledging the problem. The MoD, in its response to this Report, must set out substantively the developments so far made, or planned with appropriate funding, which it believes will rectify this imbalance across the ISTAR chain. (Paragraph 14)
3. The MoD and the Armed Forces must be congratulated for bringing ASTOR into service with due modifications, which is proving to be a valuable asset in the mission in Afghanistan. This capacity to bring into use equipment designed for another purpose in another theatre has been a hallmark of recent UK operations: while not ideal, it does show clearly the adaptability and flexibility of our Armed Forces, something which will always be needed no matter how tailor-made for a specific theatre equipment might be. (Paragraph 17)
4. DABINETT is a vital programme for the future of UK ISTAR capability. It sits at the heart of the capacity of the Armed Forces effectively to use the information gleaned from their many platforms and sensors. It provides new capacity to process as well as to disseminate information and intelligence, without which the past and current funding of collection capability will at least in part have been wasted. The MoD must make as clear as possible in its response to this Report the importance it accords to the DABINETT programme as a tool to improve general UK military capability, and to assist with the mission in Afghanistan. We expect the Strategic Defence Review properly to acknowledge that DABINETT is central to winning the intelligence war over the enemy, and thus to our national security. (Paragraph 22)
5. Bandwidth and frequency issues clearly remain. The MoD is very much aware of them, and understands that their prominence is possibly going to grow as ISTAR use and the practice of better and more widespread dissemination of data becomes the norm. We look to the MoD in its response to this Report to update us on its work to optimise the amount of bandwidth needed for efficient ISTAR use, and to secure the appropriate bandwidth. The MoD should also update us on current ISTAR frequency challenges. Success in asymmetrical conflict is massively reliant upon good intelligence—but intelligence needs to be shared quickly and efficiently to be effective. (Paragraph 28)
6. We are impressed by the pragmatic approach taken by the UK's Armed Forces since their initial deployment in Afghanistan in adapting technologies to hand and adding

to them through the UOR process, to make them as interoperable as possible with others held by UK Armed Forces and by coalition partners. (Paragraph 33)

7. The ISTAR process needs to be as strong as possible across all three Services and extending over into coalition partners. We expect this to be understood not just within the MoD, but, in the interests of our more general national security, across the whole of Government. (Paragraph 33)
8. ISTAR will remain a vital capability. It will be central to dominating the battlespace for the foreseeable future. The MoD must therefore look to reconfigure some of its trades to create more flexibility and greater opportunities for advancement for those with skills relating to ISTAR use. A supply of sufficient appropriately skilled people to undertake the demanding roles within ISTAR is vital. (Paragraph 39)
9. We consider it vital that deploying units are exposed to training on theatre standard ISTAR equipment, where possible identical to that used in operations. This has not always been possible, especially where equipment was procured through the UOR process and the urgency of need required deployment directly to theatre. We are pleased that the MoD has put such important training in place. A working knowledge and hands-on experience of using ISTAR capability is vital to enhancing awareness and increasing efficient use of this capability, not just for specialists but for the Armed Forces more generally. (Paragraph 41)
10. We have been very impressed by the commitment, not just within all parts of the MoD and the Armed Forces but also within industry working with the military, to improve detection of IEDs as a priority, and to work creatively and co-operatively to that end. The technologies and techniques refined during the current campaign in Afghanistan must be mainstreamed into future UK ISTAR capability. (Paragraph 44)
11. The expectations of what ISTAR can contribute to minimising civilian and UK military casualties must be kept in proportion. Commentators and the public find it hard to understand why coalition forces equipped with superior technology cannot prevail more easily and counteract IEDs and insurgents. It is imperative that the MoD explain the contribution of ISTAR to these activities. Realism about the nature of asymmetric warfare is essential if we are to enable ISAF and other similar missions to succeed. (Paragraph 46)
12. There is the possibility that plans for the development of ISTAR capability might be put to one side or slowed during the process of the Strategic Defence Review, not just on account of financial constraints but because of the cross-Service nature of the capability. This should not be allowed to happen. (Paragraph 48)
13. We must emphasise that failure to proceed at least according to existing plans to improve ISTAR capability and to fund those improvements sufficiently that they accord with the existing timetable would be misguided. This would imperil the UK's ability to maintain the technological/intelligence edge over current and future adversaries. (Paragraph 49)
14. ISTAR is at the heart of flexibility and effectiveness in operations, maximising efforts and concentrating the impact of other existing capabilities. This vision of the

centrality of ISTAR to overall defence capability needs to be taken into the Strategic Defence Review. The control of this vital resource needs to be clarified to ensure proper coordination and development of ISTAR across the Services. We invite our successor Committee to consider monitoring the place of ISTAR in the Review and to ensure that it does not get overlooked on account of pre-occupation with tightening budgets, individual single Service procurement programmes or issues of the size and structure of the Armed Forces. (Paragraph 50)

Introduction

1. ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) is a vital joint enabling capability which aims to provide an operational commander with the situational awareness and understanding needed to make well-informed decisions on operations. It relies on combining the output of many sensors ranging from space-based surveillance to human observation. The use of a variety of ISTAR assets is central to current operations in Afghanistan not just within the UK's Armed Forces but across the coalition.

2. At the beginning of 2008, mindful of the importance of ISTAR to the Armed Forces, we decided to begin a series of inquiries which would examine significant elements of ISTAR use. Our first Report in this series, *The contribution of Unmanned Aerial Vehicles to ISTAR capability*, was published on 5 August 2008.¹ The Government response to that Report was published on 5 November 2008, and later that month we signalled our intention to conduct our second inquiry into ISTAR during 2009.²

3. Our first inquiry, in addition to laying the groundwork for future ISTAR inquiries, concentrated on one of the principal means of collecting information, Unmanned Aerial Vehicles (UAVs). We signalled in the Report on UAVs the intention to examine later in this Parliament the MoD's progress in addressing the challenge of how better to process and disseminate the information collected. Given the importance of current UK operations in Afghanistan, we decided to use our second inquiry to probe the area of processing and dissemination within the context of the current and anticipated future operational use of ISTAR assets. The key questions on which we wished to focus were:

- How are the various ISTAR capabilities being managed and coordinated: who has overall Command and Control in the UK and on operations?
- What contribution have existing systems in Afghanistan made to ISTAR capability?
- What difference has ISTAR made to the security of UK deployed troops, for example in reducing the number of IED casualties?
- To what extent has ISTAR increased the accuracy of coalition targeting and reduced civilian casualties?
- To what extent are the right personnel in place, and trained, to deliver ISTAR in operations?
- Have the benefits of Network Enabled Capability been realised in permitting a greater variety of sensors and weapons to be available on demand to commanders and troops on the ground?
- What are the gaps in current ISTAR capabilities?

1 Defence Committee, *The contribution of Unmanned Aerial Vehicles to ISTAR*, Thirteenth Report of Session 2007–08, HC 535

2 Defence Committee, *The contribution of Unmanned Aerial Vehicles to ISTAR: Government response to the Committee's Thirteenth Report of Session 2007–08*, Twelfth Special Report of Session 2007–08, HC 1087

- What more needs to be done for the full benefits of ISTAR to be realised?
- To what extent are existing ISTAR systems and capabilities interoperable with coalition forces?
- What lessons can be drawn from current operations for developing future capabilities?

4. During the inquiry we had a preliminary private briefing from the Ministry of Defence (MoD) and held two evidence sessions: on 14 July 2009 we heard from those within the Armed Forces responsible for ISTAR capability and assets—part of this session was held in private and the redacted transcript is appended to the Report.³ On 20 October 2009 we heard from the defence industry and then from those who had recently been employing ISTAR assets and capabilities in operational theatre. During our visit to Washington DC in October 2009 we also had the opportunity for briefings on ISTAR at the Pentagon and from Northrop Grumman, Lockheed Martin and Raytheon. Before considering this Report we have also had the benefit of visiting UK Forces in Afghanistan where we received a number of briefings on ISTAR capability and use. We are grateful to all those who submitted written memoranda,⁴ gave oral evidence or briefed us during the course of this inquiry.

Background: principal issues

5. The “ISTAR chain” is the term used to describe how ISTAR capability functions. ISTAR assets are directed to collect information which then is passed on to where it is processed—the information can then be processed into intelligence (useful and accurate elements of information) and disseminated to where it can be of most value. This chain is thus made up of the links *Direct*, *Collect*, *Process* and *Disseminate*: any weakness in one of these links weakens the chain as a whole. During our first ISTAR inquiry, we considered it important to examine whether the strength of this capability was balanced across all four areas.

6. Our 2008 Report focussed on the role of Unmanned Aerial Vehicles (UAVs) in collecting and passing on information, but also examined what then happens to that information. We noted that the MoD had concentrated its principal efforts on improving its collection assets. Yet significant improvements still needed to be made to processing and disseminating the information collected.⁵ In evidence to us last year, Air Vice-Marshal Dixon, Capability Manager (Information Superiority), MoD, acknowledged that “in the past [...] [the MoD has] [...] focussed too much on platforms and platform numbers as opposed to distribution.”⁶

7. Our 2008 Report highlighted, with regard to processing and disseminating ISTAR-collected information/intelligence, the slow progress in delivering full Network Enabled Capability (NEC). NEC simply means the efficient networking of all appropriate assets to enable speedy and effective use of the capabilities of which they are part. We noted in

3 Qq 67–80

4 Ev 34–61

5 HC (2007–08) 535, paras 45 and 47

6 Q 4

particular the importance to NEC of the Defence Information Infrastructure (DII) and DABINETT programmes.⁷ We also raised bandwidth issues in disseminating information,⁸ challenges in recruiting and training personnel not just to use ISTAR assets effectively but to process the information collected⁹, and difficulties sharing processed information (intelligence) effectively not just within the UK's Armed Forces but amongst coalition partners in theatre.¹⁰

8. Seen through the prism of a highly asymmetrical conflict in which ISTAR capabilities are being employed more intensively than ever before, the importance of addressing all of the weaknesses and challenges set out in our 2008 Report is more critical than ever. Notwithstanding the progress and activity reported in the Government response to our Report, they clearly merited renewed and in some instances more detailed consideration. As is the case with most technologies, operational use assists and speeds up development and change. The Afghan theatre of operations is witness to considerable and rapid changes in how ISTAR assets are used and in the technology which underpins the UK's ISTAR capability. In that sense, **this Report can provide only a useful snapshot of the principal issues relating to the current contribution of ISTAR to operations and set down a few markers for the future. We have not had the chance to examine all the issues we hoped to address in this inquiry, but we hope that our successor Committee will continue to monitor this area. It is crucial not only to the success of the current ISAF mission but also to the future defence and security needs of the United Kingdom.**

Balance across the ISTAR chain

9. The continuing development of new and improved UAVs and sensors remains important to augmenting current capability. However, as we noted above, the areas most in need of attention are not collection, but dissemination and processing. In our 2008 Report we noted that:

The MoD faces a major challenge to ensure that the systems which process and disseminate the ISTAR information collected keep pace with the systems which collect it.¹¹

10. In its response to our Report, the Government acknowledged “the need to balance the emergent capabilities delivered by its new generation of capable collectors [...] with appropriate processing and dissemination capabilities.” The Government then listed a number of the challenges it was addressing in this area: providing adequate numbers of trained analysts, better exploitation of NEC, improved storage for intelligence and better user access to intelligence stored.¹² During the inquiry that led to this Report we were keen to assess what progress the MoD had made in these areas.

7 HC (2007–08) 535, paras 6–11. DABINETT is an incremental programme that will improve the coherence and networking of ISTAR across defence. It is expected to include a combination of existing and future platforms and sensors, support centres and links to intelligence systems.

8 *ibid.*, paras 69–73

9 *ibid.*, paras 87–94

10 *ibid.*, paras 99–104

11 HC (2007–08) 535, para 22

12 HC (2007–08) 1087, response to recommendation 22

11. In our first evidence session, Air Vice-Marshal Dixon stated that the top priority was “distributing our ISTAR product efficiently”. He acknowledged that the MoD had “in the past [...] probably focused too much on platforms and platform numbers as opposed to distribution”. He added that the Armed Forces were “getting into balance better now” but that distribution was “the biggest challenge technically”.¹³ The defence industry, which had been critical of imbalance in the ISTAR chain during our 2008 inquiry,¹⁴ acknowledged during this inquiry that the MoD had taken a number of important steps to redress this imbalance. Joel Grundy, giving evidence to us on behalf of Intellect at our second public session, said that “the MoD has very much recognised and put in place a number of things in the forward programme specifically to boost capability in the DPD [directing, processing, disseminating] environment.”¹⁵

12. Joel Grundy was however keen to add that the defence industry would maintain a degree of “scepticism” about progress until the MoD actually delivered on “those things in the forward programme”.¹⁶ This scepticism is not based on a perception that the MoD fails to understand the urgent need better to process and disseminate the information its assets collect. It is founded on an acknowledgement of likely financial and budgetary constraint, which was a theme throughout our session with industry. The written memorandum from Intellect was rather more robust in its views than Intellect’s Head of Defence and Security had been when giving evidence:

Funding constraints for DPD have been a significant factor and [...] UK Defence as a whole must rid itself of the dangerous misconception that purchasing a collection asset is the same as acquiring a new ISTAR capability. What resource is available must be balanced across all stages of the intelligence cycle to ensure maximum benefit, rather than concentrated on buying the maximum number of platform assets.¹⁷

13. There is of course logic behind the MoD’s initial focus and priority being on ISTAR collection assets—both sensors and platforms—rather than on distribution and processing. Information has to be collected before anything can be done with it. However, the mission in Afghanistan with its peculiar and rapidly changing asymmetric challenges has intensified this focus on collection. As Mr Victor Chavez, Deputy Chief Executive of Thales UK, explained to us:

the shift to asymmetric warfare has created a huge increase in the burden, the requirement and the challenge of ISTAR; because you have moved from an environment where in conventional warfare you are talking about identifying an enemy tank, or identifying an enemy platoon of soldiers; the ISTAR challenge of Afghanistan [...] is about identifying the terrorist, the terrorist in the crowd at the market, the terrorist with an AK47.¹⁸

13 Qq 3–4

14 HC (2007–08) 535, Ev 63, for example

15 Q 83

16 *ibid.*

17 Ev 39 para 10

18 Q 86

14. We are pleased to hear that the MoD is now giving priority to improving the dissemination of information collected by ISTAR assets in theatre. The Armed Forces' capacity to process and disseminate information they receive clearly falls behind their capacity to collect. We commend the MoD for acknowledging the problem. The MoD, in its response to this Report, must set out substantively the developments so far made, or planned with appropriate funding, which it believes will rectify this imbalance across the ISTAR chain.

ASTOR and ISTAR

15. Efforts to augment collection capability, or to improve sensors and collection assets in theatre, should not halt on account of any current imbalance in the ISTAR chain. Recently, ASTOR (Airborne Stand-off Radar) was deployed for use in Afghanistan, ahead of its initial operational capability date, and trialled for use with the Royal Marine Commandos with great success. ASTOR is a ground surveillance system designed to provide a long-range, battlefield intelligence, target imaging and tracking radar applications in peacetime, wartime and in crisis operations. It provides 24 hour, all-weather, battlefield surveillance capability—it is capable of detecting and recognising moving, static and fixed targets at stand-off range. The ASTOR system comprises five Sentinel R 1 aircraft and eight ground stations. The Sentinel is crewed jointly by the British Army and Royal Air Force. As Vice Air-Marshal Dixon explained to us:

[...] the sensors that it has on board [...] are SAR (synthetic aperture radar) and a ground-moving target indication radar working together with the range and capability of the aircraft [...] prove to be hugely useful in the operational context of the deployment.

ASTOR gives to the coalition and to UK forces a wide-area surveillance capability, which provides much greater flexibility of movement to commanders on the ground.¹⁹ It has particular ability to detect moving targets and is very useful for cross-cueing²⁰ purposes. It is similar in type to the US JSTAR capability: it makes use of ground stations to which it sends information which can there be analysed and matched against other information outputs.

16. ASTOR is now being successfully deployed in Afghanistan. Yet, as Mr Eberle, the UK Business Development Director of Mission and Security Systems for General Dynamics, explained to us, it had been designed for a different theatre and a different use:

[ASTOR] was a system that was originally designed, of course, quite some considerable time ago for conducting operations against the mass armour of the Warsaw Pact [...] [I]t is showing today that it is very, very relevant for today's operations [...] Its ability to detect moving targets through its radar system, which is

19 Q 11

20 Cross-cueing is the process whereby information of different types (video footage, infra-red, communications) is directed and configured to be relayed from a number of different sensors and platforms and assembled to corroborate and confirm a fuller and more detailed intelligence picture of the object/s or area in question.

its main sensor, is absolutely vital because operations are taking place now in very extended areas.²¹

17. The MoD and the Armed Forces must be congratulated for bringing ASTOR into service with due modifications, which is proving to be a valuable asset in the mission in Afghanistan. This capacity to bring into use equipment designed for another purpose in another theatre has been a hallmark of recent UK operations: while not ideal, it does show clearly the adaptability and flexibility of our Armed Forces, something which will always be needed no matter how tailor-made for a specific theatre equipment might be.

DABINETT

18. DABINETT is an incremental programme that will improve the coherence and networking of ISTAR across defence. It is expected to include a combination of existing and future platforms and sensors, support centres and links to intelligence systems.²² Our 2008 Report identified that the DABINETT programme was central to improving significant areas of ISTAR capability. In that Report we asked the MoD to update us on progress with DABINETT, and the Defence Information Infrastructure (DII) programme of which it is a significant part.²³ The Government in its response acknowledged that “DABINETT is the principal Defence funded programme with the primary focus of incrementally improving DPD capability”, which “aims to provide new tools and procedures for ISTAR management and processing and to break down legacy intelligence stovepipes by, for example, improving awareness of existing intelligence and access to collected information.”²⁴

19. The MoD was however able to offer very little in terms of clarity about timelines for when DABINETT, and DII as a whole, would improve the UK’s ISTAR capability. The same order of priority that had affected ISTAR assets as a whole for the past seven or eight years has also dogged this programme. The DABINETT programme contains two principal elements: the element connected to the procurement of a number of “deep and persistent collection assets” has already received funding agreement from the Treasury,²⁵ although a decision had yet to be made on its final form.²⁶ However, perhaps the more urgent element of the programme, relating to the direction of ISTAR assets and the processing and dissemination of information received, was still “very much in the concept phase and should be moving to an initial operating capability in 2012”.²⁷ Once again, priority seems to have been given to collection when principal challenges still lie with processing information into intelligence and getting it quickly to where it is most needed.

20. Defence industry witnesses confirmed the importance of DABINETT to the ISTAR chain. Victor Chavez of Thales UK told us that “the centrality of DABINETT to actually

21 Q 94

22 HC (2007–08) 535, Ev 51

23 *ibid.*, para 47

24 HC (2007–08) 1087, response to recommendation 8

25 Q 13

26 Q 39

27 Q 13

making the most of all the information that has been gathered cannot be understated.”²⁸ He went on to explain:

DABINETT is effectively the creation of the software application that will allow intelligence that has been gathered from a whole range of different sources to be viewed, integrated and shared as a single whole. You will be able to look at imagery that has come off a Hermes 450 or a WATCHKEEPER, imagery off an ASTOR, human intelligence that has been put into the system and various other things so that you can actually start to look at the same problem from lots of different perspectives.²⁹

21. Defence industry witnesses held back from saying that DABINETT would directly be affected by possible budget cuts within the MoD. However, doubts about the capacity of the MoD fully to implement its plans clearly made these witnesses hesitant about predicting when DABINETT would be available to improve UK ISTAR capability. The MoD memorandum to us said very little about its progress and prospects. MoD witnesses were more open with us when they gave oral evidence. Air Vice-Marshal Dixon reported “that there is sufficient money in the DABINETT programme to do what we want”, although he admitted that the outcome of the forthcoming Strategic Defence Review might have implications for the programme (a matter we will deal with later in this Report).³⁰ We were pleased to note very recently in a Written Ministerial Statement that the next phase of DII is going ahead as planned, as suggested to us at earlier evidence sessions.³¹

22. DABINETT is a vital programme for the future of UK ISTAR capability. It sits at the heart of the capacity of the Armed Forces effectively to use the information gleaned from their many platforms and sensors. It provides new capacity to process as well as to disseminate information and intelligence, without which the past and current funding of collection capability will at least in part have been wasted. The MoD must make as clear as possible in its response to this Report the importance it accords to the DABINETT programme as a tool to improve general UK military capability, and to assist with the mission in Afghanistan. We expect the Strategic Defence Review properly to acknowledge that DABINETT is central to winning the intelligence war over the enemy, and thus to our national security.

Bandwidth and frequencies

23. A number of issues combine to create challenges for the processing and dissemination of ISTAR information. Historically, ISTAR collection assets have developed within each of the three Services and have not been intended to speak to each other: this ‘stove-piped’ inheritance focused on vertical transmission—from the sensors to those immediately in the chain below—and neglected horizontal transmission, either between platforms or between those directly connected to different platforms.

28 Q 88

29 Q 100

30 Q 15

31 HC Deb, 19 January 2010, col 7WS

24. A problem facing effective horizontal distribution is bandwidth size and frequency availability. We raised this with the MoD in our 2008 Report, principally with regard to ‘UAV to ground’ transmissions, when we noted:

UAVs are collecting increasing amounts of ISTAR information, in a range of different formats, which is then disseminated to users. This is putting increasing pressure on the available bandwidth. The MoD is alert to this issue and is “bandwidth conscious”.³²

We asked the MoD to respond to our concerns in its response, which it did, stating that its approach to this issue was two-fold: to seek to minimise the bandwidth requirement for UAVs, through compression and other techniques, and “to seek to secure though the appropriate spectrum management organisations continued access to the minimum bandwidth required for operation of UAVs in national and international air space.”³³

25. Our 2008 comments and the UK Government response focused on bandwidth and frequency issues affecting UAV use. However, as we have noted above, while the challenges facing the vertical distribution from sensor to the ground-based collection point are important, disseminating the information thereafter, and the intelligence once processed, is more challenging still. Horizontal dissemination is more than just a matter of passing information from one sensor or platform on to another unit or user so that the information becomes available to them. It sits at the heart of cross-cueing, of placing together all the appropriate information relayed from different platforms and/or sensors covering the same or similar areas or phenomena, sometimes over a short period of time, in order to increase the resolution of the information and therefore to improve the quality of the intelligence available. This process of cross-cueing, enabled by the layering of ISTAR assets by those in charge of directing their use, is key to maximising the efficiency of military capability and reducing coalition and civilian casualties.

26. As Air Vice-Marshal Dixon told us in evidence:

Cross-cueing [...] is about bringing different ISTAR platforms and performance capabilities together in a particular task and then taking the full value of the total product.³⁴

Clearly, the direction of assets is important in order to ensure, as Brigadier Abraham told us, that they are “at the right readiness at the right place and the right time”³⁵ However, given the historical legacy of stove-piped assets, the ISTAR chain has also to be joined together effectively to bring all of this information to where it is most needed. Air Vice-Marshal Dixon noted that the MoD had

made a very significant investment, currently under urgent operational requirement in theatre, to connect the whole network of ISTAR assets at the operator level, so where these platforms come down through technical stovepipes because of the legacy equipment the folks on the ground who are looking at all these individual products

32 HC (2007–08) 535, para 73

33 HC (2007–08) 1087, response to recommendation 15

34 Q 7

35 Q 8

hitherto could not speak and collaborate with each other very readily [...] [the] [...] investment in theatre [...] has hugely improved that interconnectivity.³⁶

27. However, bandwidth and frequency issues remain. As Air Vice-Marshal Dixon said, “bandwidth is a real issue and we constantly worry about bandwidth.” He added that sufficient bandwidth was available for current operations but said that in the context of an understanding that bandwidth need would rise very significantly in the future, as indeed it has already done.³⁷ As Mr Chavez of Thales UK pointed out:

There is always an issue around bandwidth, but having ISTAR is highly addictive: the more you have the more you want [...] and there will always be challenges in that. Industry is doing a lot to make sure very smart algorithms are used to compress data, [...] but bandwidth is limited by the laws of physics.³⁸

Brigadier Messenger noted that the challenge lay in “ensuring that the information that is gathered by [...] [a] [...] sensor is not only available to me, it is available to subordinate units, it is available to flanking formations, it is available to anyone that needs it. That is quite a [...] dissemination challenge and bandwidth is one of the constraints associated with it.”³⁹

28. Bandwidth and frequency issues clearly remain. The MoD is very much aware of them, and understands that their prominence is possibly going to grow as ISTAR use and the practice of better and more widespread dissemination of data becomes the norm. We look to the MoD in its response to this Report to update us on its work to optimise the amount of bandwidth needed for efficient ISTAR use, and to secure the appropriate bandwidth. The MoD should also update us on current ISTAR frequency challenges. Success in asymmetrical conflict is massively reliant upon good intelligence—but intelligence needs to be shared quickly and efficiently to be effective.

Data standardisation and inter-operability

29. It is of course one thing for data to be distributed efficiently around a network, between platforms or users, and another for it to be ‘readable’. Moreover, the historic development of separate interfaces and software, not just amongst countries within the same coalition but across the three Services of one country’s military, means that regardless of bandwidth availability ISTAR assets cannot always speak to one another. We raised this issue in our 2008 Report and stressed that it was vital that “the MoD ensures that interoperability is a key requirement when acquiring future UAV systems”.⁴⁰ In the MoD response, the issue of standardisation of frequency and downlinks was highlighted, noting that “interoperability is currently achieved on [...] relatively low technology, analogue downlink” and that “the need for more efficient use of the radio frequency spectrum has already mandated the move to digital downlinks for future capabilities.” However “with no internationally agreed

36 Q 23

37 Q 42

38 Q 98

39 Q 119

40 HC (2007–08) 535, para 104

single standard there remain challenges to overcome to ensure that the user has access to all the information collected by coalition ISTAR platforms.”⁴¹

30. We put the question of interoperability directly to Air Vice-Marshal Dixon in open session. He stated that the current picture was “mixed” and saw interoperability in three layers:

There is absolute interoperability where it is absolutely seamless, interoperability between platforms, there is operability that can be generated by a cut-out but nonetheless which is working, and then, frankly, there is stuff that is totally not interoperable but that we try to de-conflict one way or the other.⁴²

He added that interoperability was a key UK as well as coalition priority and was “the connecting theme between very many of the UOR investments made [...] over the last few years in both theatres.”⁴³ He was also content that downlink issues were not significant at present. Air Commodore Gordon added that while the UK nor the coalition was at the stage where “integrated systems [...] merge seamlessly” they were at the position where “a large number of comparable systems [...] interact.”⁴⁴ He stressed the importance of NATO’s standardisation agreements to the coalition’s ISTAR capability⁴⁵ (particularly with regard to the centrality of Link 16, used across theatre as a common data link).

31. When we spoke to industry witnesses about data standardisation, crucial to ensuring that information distributed across networks is ‘readable’ and usable, the importance of NATO standards was again highlighted: “it is NATO standards that build the bedrock on which everybody will interact [...]”⁴⁶ and later in the same session: “NATO [...] provides the most cohesion in standardisation activity on a multinational basis [...]”⁴⁷ Clearly, the current coalition in the Afghan theatre does not comprise NATO countries alone, and there are commercial and political pressures to develop other standards, one for EU countries for example. However, industry witnesses were clear that NATO standards, regardless of their current exclusivity, were the ones on which to build. Mr Peter Eberle told us: “As far as European interoperability is concerned, I do not think the MoD’s view on this has changed; because they would wish to use NATO standards wherever possible, rather than introduce some new European standard.”⁴⁸

32. Making ISTAR capability uniform across the UK Armed Forces, in terms of software, interfaces and general technological content, is inevitably a distant dream given the legacy of assets, often procured on a Single-Service basis, with which they are faced. Across the coalition this phenomenon is of course multiplied numerous times. There are, however, a number of things to be learned from this:

41 HC (2007–08) 1087, response to recommendation 21

42 Q 24

43 *ibid.*

44 Q 25

45 *ibid.*

46 Q 89

47 Q 96

48 *ibid.*

- a) that, regrettably, neither the MoD and UK Armed Forces or NATO were sufficiently far-sighted or determined to outline and resolve difficulties of interoperability before they became practically evident;
- b) that, nonetheless, both in terms of UK assets (procured as UORs) and otherwise, both the problems faced within the UK Forces deployed in theatre and those across the coalition have been addressed pragmatically and in good part resolved to a level of enhanced efficiency in terms of ISTAR capability; and
- c) that current procurement needs to be adapted and future procurement designed to create as open a technological/interface architecture as possible not just to permit internal technological development but to permit interoperability, both across the Services in the UK Armed Forces, and across coalitions in international missions.

33. We are impressed by the pragmatic approach taken by the UK's Armed Forces since their initial deployment in Afghanistan in adapting technologies to hand and adding to them through the UOR process, to make them as interoperable as possible with others held by UK Armed Forces and by coalition partners. The urgency of the demands from the Afghan mission required such an approach, but this should not reduce the importance of arguing that all current and future procurements in this area are capable of receiving and using as varied an array of communication and data links as possible. **The ISTAR process needs to be as strong as possible across all three Services and extending over into coalition partners. We expect this to be understood not just within the MoD, but, in the interests of our more general national security, across the whole of Government.**

People: skills, training and awareness

34. The ISTAR chain does not consist only of technologies: its assets properly include people, and the complicated interface between personnel and ISTAR is integral to the success of the capability. In our previous, 2008, Report on ISTAR we focused on those personnel trained to operate UAVs and on image analysts, one element of those employed to help process collected information. We were “concerned to learn that there [...] [were] [...] substantial deficits in the number of UAV operators in the Army”, a circumstance that was expected only to worsen. We also noted what at the time was an 18% deficit in image analysts in the RAF, and that other manning pinch-points had the capacity to impact upon the effectiveness of UK ISTAR capability.⁴⁹

35. In its response, the Government noted some particular personnel shortages. It stressed that they would have no impact on current operations, and that measures were in place to deal with possible challenges that might occur over the next few years. The response clearly showed that current operations were only being sustained in ISTAR personnel terms with some difficulty, and in a manner which was not sustainable over the medium term.⁵⁰

36. We probed this area of skills and personnel in oral evidence. At the outset of our first session, Air Vice-Marshal Dixon noted “the perennial difficulty in acquiring and retaining the detailed technical trades, that underpin [...] [ISTAR] [...] capability”.⁵¹ These

49 HC (2007–08) 535, paras 92–94

50 HC (2007–08) 1087, responses to recommendations 17, 18 and 19

51 Q 3

difficulties in making “meaningful career structures”, for image analysts, for example, meant that in some areas both recruitment and retention were difficult.⁵² There was a degree of “small trade-itis” in some key ISTAR personnel areas that needed to be addressed.⁵³ Brigadier Abraham noted that there were ways “to mitigate part of the problem” of personnel or skills shortages “by deploying and using your smaller force more often than is desirable”.⁵⁴ However, this had obvious implications for harmony guidelines, and therefore could impact upon retention and, potentially, recruitment. Mr Chavez of Thales UK stressed the importance of trained personnel to ISTAR:

“The challenges of delivering these capabilities on a day-to-day basis are absolutely as much about having the skills and the humans trained to do the job as they are about the technology dimension.”⁵⁵

He noted that the MoD recognised that there was a “skills gap today and an anticipated skills gap in the future” and considered that such a recognition lay “at the heart of making good progress.”⁵⁶

37. We asked whether work relating to some of these key skills, currently in short supply, could be provided by industry on sub-contracts. The MoD acknowledged that it was looking into this, in particular with regard to linguistic skills, but that it would only ever be a “stop-gap, a mitigating measure, rather than this is our preferred way”.⁵⁷ As the recent Green Paper has pointed out, improved collaboration with allies and with industry will be an important element of the future.⁵⁸ The MoD should look at maximising the usefulness of industry inputs into or support for its ISTAR capability, even if that is not the MoD’s “preferred way”, because it may in some areas be the only way of maintaining effective ISTAR capability in the short to medium-term.

38. In its memorandum to us, the MoD highlighted continuing shortages of linguists, image analysts, human intelligence operators/interrogators and Royal Engineers (Geographic). Manning shortfalls in these areas range from 10% up to around 40%. Steps are underway to address these particular shortages. In other areas the level of shortfall also causes concern and is being addressed: the Royal Navy acknowledges that the demands of maritime ISTAR may require changes in its requirement for Royal Navy Intelligence Specialists. Systematic initiatives in place across the three Services to address current and future ISTAR capability personnel requirements include: revised career structures, improved training and financial incentives for specialists; updated recruitment strategies and increased internal transfers from other trade areas; and the reorganisation and redistribution of existing personnel.⁵⁹

52 Q 18

53 Q 22

54 Q 20

55 Q 92

56 Q 93

57 Qq 50–51

58 Ministry of Defence, *Adaptability and Partnership: Issues for the Strategic Defence Review*, Cm 7794, February 2010, p 39

59 Ev 33–34

39. ISTAR will remain a vital capability. It will be central to dominating the battlespace for the foreseeable future. The MoD must therefore look to reconfigure some of its trades to create more flexibility and greater opportunities for advancement for those with skills relating to ISTAR use. A supply of sufficient appropriately skilled people to undertake the demanding roles within ISTAR is vital.

40. We accept Brigadier Messenger's point that now ISTAR is "everyone's business": specialists only form a small part of those for whom ISTAR capability is a key part of their work—"it is part of the bloodstream now when perhaps ten years ago it was not."⁶⁰ This of course presents challenges of its own: the human-technology interface is more complicated than before and there is a greater need for the Armed Forces more generally to have a good understanding of what ISTAR can and cannot do. This perhaps applies particularly to those with responsibility for accessing or directing ISTAR assets. We were pleased to hear from Air Vice-Marshal Dixon that the MoD has been aware of this more general issue for some time and has made available out of the equipment programme a facility at Shrivenham where pre-deployment battle procedure work-up training for deploying brigades takes place on the same equipment as is used in theatre. This capacity for pre-training on theatre equipment will only increase as DII is rolled out.⁶¹

41. We consider it vital that deploying units are exposed to training on theatre standard ISTAR equipment, where possible identical to that used in operations. This has not always been possible, especially where equipment was procured through the UOR process and the urgency of need required deployment directly to theatre. We are pleased that the MoD has put such important training in place. A working knowledge and hands-on experience of using ISTAR capability is vital to enhancing awareness and increasing efficient use of this capability, not just for specialists but for the Armed Forces more generally.

ISTAR and Improvised Explosive Devices

42. One vital use of ISTAR assets in the current campaign in Afghanistan is the detection of improvised explosive devices (IEDs). These devices, often placed at or near the roadside, have been responsible for the majority of UK deaths in Afghanistan and continue to pose a significant threat to UK military and civilian personnel, and to Afghan civilians; and those who deploy them continually change and improve their techniques and the undetectability of the devices used. The fight to neutralise the IED threat takes many shapes, from increased force protection (vehicles with better armour, for example) to changes in tactical procedure and practice. One key element of this fight is improved ISTAR use to detect the possible presence of IEDs so that they may be neutralised.

43. This area is obviously one of great sensitivity and was not touched upon in oral evidence. However, several of the memoranda make reference in passing to the utility of ISTAR assets in IED detection.⁶² The Prime Minister on 14 December 2009 made clear that the counter-IED strategy was central to the UK thinking in Afghanistan.⁶³ ISTAR more

60 Q 146

61 Q 62

62 See, for example, Ev 35–6 and Ev 45

63 HC Deb 14 December 2009, cols 641–2

generally, outwith its specific use against IEDs, has a role in limiting both UK/coalition military and Afghan casualties; counter-IED activity has added focus in the public's eyes to this more general role. As the MoD says in its memorandum:

“Coalition ISTAR assets are [...] used to assist with the Counter Improvised Explosive Device (C-IED) campaign, to detect possible enemy force IED teams and provide a route clearing capability that can highlight areas of risk. There are a number of examples where friendly ground forces have been forewarned by ISTAR assets of areas which might contain IEDs and this helps to minimise the risk of sustaining casualties and on a number of occasions has prevented potential casualties.”⁶⁴

44. ISTAR is only one part of the counter-IED campaign, but it is an important one. Other theatres of war in the future will undoubtedly feature similar threats, even if not on the level apparent in Afghanistan. **We have been very impressed by the commitment, not just within all parts of the MoD and the Armed Forces but also within industry working with the military, to improve detection of IEDs as a priority, and to work creatively and co-operatively to that end. The technologies and techniques refined during the current campaign in Afghanistan must be mainstreamed into future UK ISTAR capability.**

45. There is however an anxiety that increasingly potent ISTAR capabilities might create a culture of dependency. There could be over-reliance on the technological advantage that ISTAR brings, stepping way from the kinetic edge that will still often be required and that can sometimes alone prove decisive. The notional or theoretical capability of any one part of the ISTAR chain will always be reduced in practice by friction with other parts of that chain and by the general background noise and uncertainty of operations.

46. **The expectations of what ISTAR can contribute to minimising civilian and UK military casualties must be kept in proportion. Commentators and the public find it hard to understand why coalition forces equipped with superior technology cannot prevail more easily and counteract IEDs and insurgents. It is imperative that the MoD explain the contribution of ISTAR to these activities. Realism about the nature of asymmetric warfare is essential if we are to enable ISAF and other similar missions to succeed.**

ISTAR and the Strategic Defence Review

47. Our first evidence session on the contribution of ISTAR to current operations took place on 14 July 2009, the day that the Secretary of State announced the preparation of a Green Paper to lay the groundwork for the Strategic Defence Review (SDR) that it is anticipated will follow the General Election. Air Vice-Marshal Dixon made it clear that the SDR would be crucial for the future of the UK's ISTAR capability. The outcome of the Review could determine the scale and configuration of future:

[The SDR] [...] is as much an opportunity for ISTAR [...] as [...] a threat, and I think a lot of the platform folks are probably looking at their fingernails a bit nervously about the Defence Review, but actually several people in the community

that I work with, in the C4ISTAR world, think this is a big opportunity because all the lessons learned point to the need to get this absolutely gripped.⁶⁵

Earlier in the same session, the Air Vice-Marshal expressed the hope that the “whole endeavour of C4ISTAR in the round gets a good belt of wind in a defence review”: he said this in the context of anticipated sufficient funding for DABINETT.⁶⁶ He also expressed optimism about the SDR concluding that personnel numbers for ISTAR would have to be increased over time.⁶⁷ Furthermore, he noted that the decision about whether or not to take on REAPER as a permanent asset, or to develop instead the requirement for a new unmanned deep and persistent collect capability as part of the DABINETT programme (and perhaps in collaboration with allies), was one that will probably “be tackled in our future Defence Review.”⁶⁸

48. Industry witnesses confirmed the importance of the forthcoming Review for the future of UK ISTAR capability, although their language was framed in the context of the possibility of cuts to ISTAR programmes:

Under the environment of a future strategic defence review there is no obvious champion for C4ISTAR⁶⁹ and yet we believe it is absolutely critical to getting the most out of your Armed Forces in the round [...] ⁷⁰

There is some reason for thinking that those capabilities considered vital for success in the Afghan mission might be ring-fenced during the Review. In his statement to the House when the Green Paper was published, the Secretary of State, after declaring that operations in Afghanistan would remain the Department’s “Main Effort”, said that “[w]here choices have to be made, Afghanistan will continue to be given priority.”⁷¹ Brigadier Messenger told us in evidence: “I do not think we can walk backwards on the level of information and intelligence that we are currently giving our commanders”.⁷² **There is the possibility that plans for the development of ISTAR capability might be put to one side or slowed during the process of the Strategic Defence Review, not just on account of financial constraints but because of the cross-Service nature of the capability. This should not be allowed to happen.**

49. We note that significant elements of the Green Paper deal with ISTAR-related issues, in terms of technology and co-operation with industry, training and skills for MoD and Armed Forces personnel, and communications and intelligence capabilities.⁷³ Nonetheless, **we must emphasise that, while cuts to the current capability might be unlikely, failure to proceed at least according to existing plans to improve ISTAR capability and to fund those improvements sufficiently that they accord with the existing timetable would be**

65 Q 75

66 Q 15

67 Q 74

68 Q 45

69 Command, Control, Communication, Computers, Intelligence, Surveillance, Target Acquisition and Reconnaissance

70 Q 112

71 HC Deb, 3 February 2010, col 303

72 Q 133

73 Ministry of Defence, *Adaptability and Partnership: Issues for the Strategic Defence Review*, Cm 7794, February 2010

misguided. This would imperil the UK's ability to maintain the technological/intelligence edge over current and future adversaries.

50. ISTAR is at the heart of flexibility and effectiveness in operations, maximising efforts and concentrating the impact of other existing capabilities. This vision of the centrality of ISTAR to overall defence capability needs to be taken into the Strategic Defence Review. The control of this vital resource needs to be clarified to ensure proper coordination and development of ISTAR across the Services. We invite our successor Committee to consider monitoring the place of ISTAR in the Review and to ensure that it does not get overlooked on account of pre-occupation with tightening budgets, individual single Service procurement programmes or issues of the size and structure of the Armed Forces.

Formal minutes

Tuesday 16 March 2010

Members present:

Mr James Arbuthnot, in the Chair

Linda Gilroy

Mr David Hamilton

Mr Dai Havard

Mr Bernard Jenkin

Mr Brian Jenkins

Robert Key

Richard Younger-Ross

Draft Report (*The contribution of ISTAR to operations*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 50 read and agreed to.

Resolved, That the Report be the Eighth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Written evidence was ordered to be reported to the House for printing with the Report, together with written evidence reported and ordered to be published on 14 July in the last session of Parliament.

[Adjourned till Tuesday 30 March at 10.00 am

Witnesses

Tuesday 14 July 2009

Page

Air Vice-Marshal Carl Dixon OBE, Capability Manager (Information Superiority), **Air Commodore N J Gordon MBE**, Air Officer ISTAR in Headquarters 2 Group, and **Brigadier Kevin Abraham**, Head of Joint Capability, Ministry of Defence

Ev 1

Tuesday 20 October 2009

Mr Victor Chavez, Deputy Chief Executive, Thales UK, **Mr Peter Eberle**, UK Business Development Director, Mission and Security Systems, General Dynamics, and **Mr Joel Grundy**, Head of Defence & Security, Intellect

Ev 19

Brigadier Gordon Messenger DSO OBE, Commander, 3rd Commando Brigade Royal Marines, **Air Commodore Stuart Atha DSO ADC**, UK Air Component Commander, and **Lieutenant Colonel Andrew McInerney**, Command Support Group, 3rd Commando Brigade Royal Marines, Ministry of Defence

Ev 26

List of written evidence

1	Northrop Grumman	Ev 34
2	Intellect	Ev 38
3	AgustaWestland	Ev 40
4	Thales	Ev 41
5	General Dynamics United Kingdom Limited	Ev 49
6	The Boeing Company	Ev 53
7	Ministry of Defence	Ev 55, 60

List of Reports from the Committee during the current Parliament

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2009–10

First Report	The work of the Committee 2008–09	HC 119
Second Report	MoD Winter Supplementary Estimate 2009–10	HC 150 (<i>HC 383</i>)
Third Report	National security and resilience	HC 149 (<i>HC 382</i>)
Fourth Report	Readiness and recuperation of the Armed Forces: looking towards the Strategic Defence Review	HC 53
Fifth Report	Ministry of Defence Annual Report and Accounts 2008–09	HC 52
Sixth Report	Defence Equipment 2010	HC 99
Seventh Report	The Comprehensive Approach: the point of war is not just to win but to make a better peace	HC 224

Session 2008–09

First Report	Winter Supplementary Estimates 2008–09	HC 52 ^A
Second Report	The work of the Committee 2007–08	HC 106
Third Report	Defence Equipment 2009	HC 107 (<i>HC 491</i>)
Fourth Report	Spring Supplementary Estimate 2008–09	HC 301 ^B
Fifth Report	Ministry of Defence Annual Report and Accounts 2007–08	HC 214 (<i>HC 534</i>)
Sixth Report	The UK's Defence contribution to the UK's national security and resilience	HC 121
Seventh Report	Defence Support Group	HC 120 (<i>HC 984</i>)
Eighth Report	Service Complaints Commissioner for the Armed Forces: the first year	HC 277 (<i>HC 985</i>)
Ninth Report	Ministry of Defence Main Estimates	HC 773 (<i>HC 986</i>)
Tenth Report	Russia: a new confrontation?	HC 276 (<i>HC 987</i>)
Eleventh Report	Helicopter capability	HC 434 (<i>HC 381</i>)
Twelfth Report	Scrutiny of Arms Export Controls (2009): UK Strategic Export Controls Annual Report 2007, Quarterly Reports for 2008, licensing policy and review of export control legislation	HC 178 (<i>Cm 7698</i>)

^A Government response published as a Memorandum in the Committee's Fourth Report (HC 301)

^B Government response published as a Memorandum in the Committee's Ninth Report (HC 773)

Session 2007–08

First Report	UK land operations in Iraq 2007	HC 110 (<i>HC 352</i>)
Second Report	Costs of operations in Iraq and Afghanistan: Winter	HC 138 ^A

	Supplementary Estimate 2007–08	
Third Report	UK/US Defence Trade Cooperation Treaty	HC 107 (HC 375)
Fourth Report	The Iran hostages incident: the lessons learned	HC 81 (HC 399)
Fifth Report	Ministry of Defence Annual Report and Accounts 2006–07	HC 61 (HC 468)
Sixth Report	The work of the Committee in 2007	HC 274
Seventh Report	Medical care for the Armed Forces	HC 327 (HC 500)
Eighth Report	Operational costs in Afghanistan and Iraq: Spring Supplementary Estimate 2007–08	HC 400 ^B
Ninth Report	The future of NATO and European defence	HC 111 (HC 660)
Tenth Report	Defence Equipment 2008	HC 295 (HC 555)
Eleventh Report	Ministry of Defence Main Estimates 2008–09	HC 885 (HC 1072)
Twelfth Report	Scrutiny of Arms Export controls (2008): UK Strategic Export Controls Annual Report 2006, Quarterly Reports for 2007, licensing policy and review of export control legislation	HC 254
Thirteen Report	The contribution of Unmanned Aerial Vehicles to ISTAR capability	HC 535 (HC 1087)
Fourteenth Report	Recruiting and retaining Armed Forces personnel	HC 424 (HC 1074)
Fifteenth Report	UK operations in Iraq and the Gulf	HC 982 (HC 1073)

^A Government response published as Memorandum in the Committee's Eighth Report (HC 400)

^B Government response published as Memorandum in the Committee's Eleventh Report (HC 885)

Session 2006–07

First Report	Defence Procurement 2006	HC 56 (HC 318)
Second Report	Ministry of Defence Annual Report and Accounts 2005–06	HC 57 (HC 376)
Third Report	Costs of operations in Iraq and Afghanistan: Winter Supplementary Estimate 2006–07	HC 129 (HC 317)
Fourth Report	The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base	HC 59 (HC 304)
Fifth Report	The work of the Committee in 2005 and 2006	HC 233 (HC 344)
Sixth Report	The Defence Industrial Strategy: update	HC 177 (HC 481)
Seventh Report	The Army's requirement for armoured vehicles: the FRES programme	HC 159 (HC 511)
Eighth Report	The work of the Defence Science and Technology Laboratory and the funding of defence research	HC 84 (HC 512)
Ninth Report	The Future of the UK's Strategic Nuclear Deterrent: the White Paper	HC 225–I and –II (HC 551)
Tenth Report	Cost of military operations: Spring Supplementary Estimate 2006–07	HC 379 (HC 558)
Eleventh Report	Strategic Lift	HC 462 (HC 1025)
Twelfth Report	Ministry of Defence Main Estimates 2007–08	HC 835 (HC 1026)
Thirteenth Report	UK operations in Afghanistan	HC 408 (HC 1024)
Fourteenth Report	Strategic Export Controls: 2007 Review	HC 117 (Cm 7260)
Fifteenth Report	The work of Defence Estates	HC 535 (HC 109)

Session 2005–06

First Report	Armed Forces Bill	HC 747 (<i>HC 1021</i>)
Second Report	Future Carrier and Joint Combat Aircraft Programmes	HC 554 (<i>HC 926</i>)
Third Report	Delivering Front Line Capability to the RAF	HC 557 (<i>HC 1000</i>)
Fourth Report	Costs of peace-keeping in Iraq and Afghanistan: Spring Supplementary Estimate 2005–06	HC 980 (<i>HC 1136</i>)
Fifth Report	The UK deployment to Afghanistan	HC 558 (<i>HC 1211</i>)
Sixth Report	Ministry of Defence Annual Report and Accounts 2004–05	HC 822 (<i>HC 1293</i>)
Seventh Report	The Defence Industrial Strategy	HC 824 (<i>HC 1488</i>)
Eighth Report	The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context	HC 986 (<i>HC 1558</i>)
Ninth Report	Ministry of Defence Main Estimates 2006–07	HC 1366 (<i>HC 1601</i>)
Tenth Report	The work of the Met Office	HC 823 (<i>HC 1602</i>)
Eleventh Report	Educating Service Children	HC 1054 (<i>HC 58</i>)
Twelfth Report	Strategic Export Controls: Annual Report for 2004, Quarterly Reports for 2005, Licensing Policy and Parliamentary Scrutiny	HC 873 (<i>Cm 6954</i>)
Thirteenth Report	UK Operations in Iraq	HC 1241 (<i>HC 1603</i>)
Fourteenth Report	Armed Forces Bill: proposal for a Service Complaints Commissioner	HC 1711 (<i>HC 180</i>)

Oral evidence

Taken before the Defence Committee on Tuesday 14 July 2009

Members present

Mr James Arbuthnot, in the Chair

Mr David Crausby
Linda Gilroy
Mr David Hamilton
Mr Mike Hancock
Mr Dai Havard

Mr Bernard Jenkin
Mr Brian Jenkins
Robert Key
Richard Younger-Ross

Witnesses: **Air Vice-Marshal Carl Dixon OBE**, Capability Manager (Information Superiority), **Air Commodore N J Gordon MBE**, Air Officer ISTAR in Headquarters 2 Group, **Brigadier Kevin Abraham**, Head of Joint Capability, Ministry of Defence, gave evidence.

Q1 Chairman: Good morning. Thank you very much for coming to give evidence to this session in our inquiry into the contribution of ISTAR to operations. Can I ask you please to begin by introducing yourselves and telling us briefly, in a sentence or so, what you do, and then we will start in on the questions properly?

Air Vice-Marshal Dixon: Good morning, Chairman. Thank you very much for inviting the MoD today. My name is Air Vice-Marshal Carl Dixon. I work in the Equipment Staffs in the main building in MoD and I have the self-motivating title of Director of Information Superiority. I sit on an organisation called the Joint Capabilities Board that looks at the whole span of our defence equipment requirement.

Air Commodore Gordon: Air Commodore Gordon. I am currently the air officer for ISTAR and Search and Rescue in Headquarters 2 Group within Air Command, but I was formerly the Head of Capability for ISTAR in MoD, working for Air Marshal Dixon.

Brigadier Abraham: Good morning. I am Brigadier Kevin Abraham. I am the Head of Joint Capability in the MoD, a post I have held for just under a year. My job specification is to shape, evaluate, arbitrate and advise on the provision of joint capabilities for current and future operations.

Q2 Chairman: Thank you. ISTAR capability—what would you say were your or the MoD's top three priorities for developing ISTAR capability?

Air Vice-Marshal Dixon: We have got many priorities, Chairman, for ISTAR.

Q3 Chairman: Only the top three.

Air Vice-Marshal Dixon: The one that is overwhelmingly dominating our thinking now is success on current operations. It transcends all other considerations in our thinking, but in the narrow sense of ISTAR technically it is the perennial challenge of distributing our ISTAR product efficiently that is key and if I were to look at an investment vector it would be there. With regard to the people that underpin our ISTAR capability, you know from previous evidence sessions that we have

a perennial difficulty in acquiring and retaining the detailed technical trades that underpin the capability, so specialists in that people dimension are a priority to try and sort out perennially. My third one would be to try and map into our defence programme a mechanism for keeping up with the extraordinary pace of technological change in this area. Our defence programme processes only move so fast and in many areas I think ISTAR and the exploitation of ISTAR is moving at a challenging pace and we need to make sure that our MoD processes are keeping in step with that change. Those are the three.

Q4 Chairman: Amongst those three top priorities would you say that distributing the ISTAR product, being the first one, is way out in front or merely a little bit ahead?

Air Vice-Marshal Dixon: I think a little bit ahead. Inevitably in life there is a balance to strike and, as you well know in this Committee, we have started to engineer MoD processes to look across all of our defence lines of development in delivering a programme. Distribution of ISTAR is often set against platforms and platform numbers and that is to simplify the debate probably a little too much but I think it is fair to say that in the past we have probably focused too much on platforms and platform numbers as opposed to distribution. We now have the technology and I think the instinct driven by operational lessons learned to put the necessary emphasis on distribution; but it has come from behind, I think, relative to platforms over a period of years. I think we are getting into balance better now but going forward I think distribution is the biggest challenge technically; to keep that distribution thing going, particularly in a coalition context.

Chairman: Yes, I think this Committee made that mistake last year when we concentrated on UAVs, and during that inquiry we came to appreciate that it was the distribution, things like bandwidth and stuff like that, that was a more important aspect of ISTAR than the platforms themselves.

 14 July 2009 Air Vice-Marshal Carl Dixon OBE, Air Commodore N J Gordon MBE and Brigadier Kevin Abraham

Q5 Robert Key: Quite clearly the surveillance and reconnaissance bits of ISTAR depend very heavily on all kinds of technology but it seems to me that both the intelligence and the target acquisition parts of ISTAR have a very important human interface too. Can you explain that interface? In other words, at what point does human intelligence hand over to the rest of the ISTAR operation? In terms of value for money would it be better to concentrate on the human side of intelligence and target acquisition for intelligence gathering rather than this immensely complex and enormous range of highly expensive technology which you are engaged in with the ISTAR project?

Air Vice-Marshal Dixon: Mr Key, I will start answering your question because it is very topical and then I will doubtless get some support from my colleagues. The simple answer to your question is that we need both. Human intelligence is an absolutely vital component of our suite of intelligence strands, never more so than now in our current operational challenges; but, if you will forgive me for being slightly mechanistic, human intelligence is a sensor in the sense that we think about ISTAR. It is a cut on the problem space. It is no secret that getting human intelligence in some of the foreign places we work in now is extraordinarily difficult. It is difficult at any time to get deep penetration with human intelligence in any space but where there are clearly big cultural differences; where, for example, in Afghanistan or Iraq there is an extended cousinage which surrounds the people we might want to learn more about, penetration with human beings into that space is very difficult and it is necessarily a very specialist role. As we have pinch trades in ISTAR technically, the intelligence agencies across our coalition probably have similar pinch trades in that domain. The truth is we need as much data on the battle space as we can possibly get, and human intelligence is absolutely key but I would not characterise it in the way your question implies, which is that there is a choice to make. It is a balance. I am pretty clear that we need the capabilities of all of our current ISTAR investments and plans but I would completely acknowledge as well that anything we can do better on the human intelligence side would be very welcome.

Brigadier Abraham: You are correct, of course, that surveillance and reconnaissance can be very platform-centric and that those can be expensive, but, just to correct the balance a little bit, surveillance and reconnaissance can also be very people-intensive. A very simple example is that Task Force Helmand has every day a reconnaissance force, about a company's size of people. The principal means of doing reconnaissance is getting out and amongst the people and reporting what they see, and, of course, they have some sensors and things to help them see at night and so on. At battle groups—and this is true of all battle groups and certainly true of Task Force Helmand—each one will have its own dedicated close reconnaissance platoon as well, and similar things apply to surveillance. Across the range of ISTAR there is always a mix between the people-heavy bit and often the platform as well, although it varies at times.

Q6 Mr Hancock: To what extent do UK ISTAR platforms in operation in Afghanistan cross-cue their information to enable the accurate identification of targets and, most importantly, the proximity of civilians to those targets?

Air Vice-Marshal Dixon: Once again, if I may, Mr Hancock, I will start that answer and I am sure other people will add some comments. Cross-cueing and layering of ISTAR is absolutely key to the overall capability and we do that with greater or lesser effectiveness depending on where we start the analysis.

Q7 Chairman: Can you begin by explaining what cross-cueing and layering is, please?

Air Vice-Marshal Dixon: Yes. Let us take a hypothetical example. If the UK Armed Forces were invited to get into a new campaign where we knew nothing of the detail of the terrain or the context, plainly we would do a pre-deployment assessment as best we could. But then, when we finally rolled our forces out into this new theatre, we would need some wider area surveillance to find out what was going on. For example, in the opening stages of the campaign in Iraq there was an air campaign. Plainly, one of the early issues for ISTAR was to try to find out where the enemy air defences were, how they were performing and how we could, as it were, open the door to the theatre. That is the first element where ISTAR comes into play but that is a wide area issue. Bringing it back to the here and now in Afghanistan, we do have a wide area surveillance requirement across the theatre but then there is an issue about the capabilities of individual platforms, and something that is looking out, staring into a wide space, is seeing a wide space story—but then there is a need to cross-cue sensors with different properties and different fidelity to look in detail. Whereas you can stare out into a space, sometimes we need to look through a straw in a particular direction to get the high definition information we want, so it is a sort of scan/cue process. Cross-cueing is the ability of one ISTAR platform, either electrically to sequence the activity of another one where the product of the total information then is improved by that cross-cueing, or through a headquarters. It does not really matter how the cross-cueing is actuated; it is the layering effect of the different sensors that is important, bringing a wider and deeper picture overall. Layering at a tactical level is a piece of battle procedure where before an operation you decide what ISTAR entities you need on a particular parade and you make sure that they are all available to go on parade together so that you can then leverage the full capacity across. Cross-cueing therefore is about bringing different ISTAR platforms and performance capabilities together in a particular task and then taking the full value of the total product. Layering is a command and control function before you get into the operation.

Q8 Mr Hancock: How often are all of those assets available to enable that to be done, and how often is it that, because they are not all available, you do not

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get the whole picture or that clearly defined picture which shows the closeness of civilians to a potential target?

Air Vice-Marshal Dixon: It depends on the circumstances. In the context of current operations we must remember that we are in a coalition operation and the ISTAR contribution to that coalition operation is a multinational issue. As you well know in this Committee, we have made certain arrangements with allocations of our own ISTAR capabilities to the coalition, and the command and control processes that go with that are necessarily coalition ones. The first thing to understand, and I am sure the Brigadier will come in on the detailed operational side of it, is that the number of ISTAR platforms that are allocated to a particular operation is a command function before the operation is initiated. Plainly there are operationally owned ISTAR assets, as in the sense of operational level, the bigger, more expensive, less numerous platforms. The logical way to command and control those in an operation is to hold the command and control at a fairly high level to allow apportionment to be done sensibly across regions; but plainly there are also tactical ISTAR capabilities that properly belong to sub-units, and make sure that all the assets line up around one operation as a command function. There is a beauty competition, if I can put it like that, to win at the tasking stage before the operation is committed that is important; so, having established where the ISTAR allocation is, you then make the cross-cueing and layering leverage that I talked about earlier.

Brigadier Abraham: In terms of what they might in theatre call deliberate operations, such as the one going on, clearly this will have been planned for some time and there will have been a great deal of deliberation in having it at the right readiness at the right place and the right time with the relevant ISTAR assets. In that sense you can maximise when you know well ahead that you are going to do something because you have to move people, platforms and so on to get the right focus. At other times, in hot contacts that were not expected, of course, the extent and range over which that operation takes place is (a) not known beforehand and (b) might be very limited geographically, so you will always seek to provide ISTAR in support, not least to improve situational awareness for many reasons, including the avoidance of damage to civilians, but it will not normally be on such a full basis as for a deliberate operation.

Q9 Mr Hancock: So what steps are we taking to work towards improving that system to avoid this civilian collateral damage which is so frequently the rub of the administration in Afghanistan?

Air Vice-Marshal Dixon: The biggest technical thing we are doing is improving our ability to connect our ISTAR imagery and products together in the planning and analysis wavelength. Hitherto we have grown our ISTAR requirements in stovepipes. Individual units, individual services, have really thought of ISTAR as just an extension of their normal platform kind of focus, but over the last few

years in the crucible of operations we have realised that the real energy needs to be put into the sharing of information. I think the collateral damage thing is about layering in the end because plainly, at the planning stage of an operation, to take the current example again, it is a matter of public record that the coalition commanding general in theatre, General McChrystal, is re-focusing the campaign to make sure the coalition do not overdo the kinetic side of things to the exclusion of progress in the hearts and minds campaign. That flavour of command intent can be actuated in the ISTAR planning by making sure that battle damage assessment, weapon selection and target analysis are all done with that objective in mind. That is exactly what is going on now and it has been enabled by the technology we have put into theatre.

Q10 Mr Hancock: What difference then would Airborne Stand-off Radar make to coalition operations, particularly in Afghanistan?

Air Vice-Marshal Dixon: It has already made a massively important difference for the better. The aircraft is in theatre now. I do not want to get into detail about what it is doing in an open session, for reasons I am sure you will understand, but we deployed the aircraft ahead of its initial operational capability date at the back end of last year for a trial with the Royal Marine Commandoes as the land force. That trial hugely exceeded our expectations at that early point of the aircraft's career and the sensors that it has on board, which is again a matter of public record, are SAR (synthetic aperture radar) and a ground-moving target indication radar working together with the range and capability of the aircraft, and they proved to be hugely useful in the operational context of the deployment. We redeployed the aircraft earlier this year for an additional trial and the aircraft is in theatre now for the third time and will remain so, certainly until the end of the year on current plans and probably longer going forward. It is a very big wide-area surveillance capability that has been hugely useful and I will happily give you some vignettes in a closed session later.

Q11 Mr Hancock: I listened to the colonel of 42 Commando on the radio last night commenting about his deployment with his unit and saying how they were able to be much more flexible and free-moving in what they were doing. Is that as a direct result of the contribution of ASTOR to that operation? Does it give the commander on the ground greater flexibility of movement?

Air Vice-Marshal Dixon: The open session answer to that is yes, it does, in a very powerful way because of the purview the sensor has over the battle space. I cannot get into detailed vignettes in an open session but I would be very happy to share with the Committee some interesting insights into ASTOR offline.

Mr Hancock: Thank you very much indeed.

Chairman: That may well be at the end of this session something that we decide to take you up on.

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Q12 Richard Younger-Ross: You have talked about the platforms. How far is the direct processing and dissemination aspect still the poor relation of the funding we are putting into the platforms?

Air Commodore Gordon: If I may take that one, I do not think it is the poor relation. I think we have to recognise that historically there has perhaps been a focus on collection and legacy stovepipe platforms, but, as technology has enabled us to join up those platforms better, we have increasingly invested in that very important space of direct process and dissemination. Certainly from my experience as Head of Capability for ISTAR, the balance of investment was in the region of 50 per cent on that collection piece and 50 per cent on the direct process and dissemination piece, so it is, I would suggest, a high priority and one that is now attracting the correct balance of investment.

Q13 Richard Younger-Ross: DABINETT—there are concerns that it is not going to be fully funded and it will be cut.

Air Commodore Gordon: It is probably worth putting DABINETT in context. There are essentially two elements to it. There is the direct process and disseminating piece that you have already spoken of and there is the collection piece focused on deep and persistent collection assets. In terms of the deep and persistent, we have previously agreed with the Treasury to bring forward money from the DABINETT programme, and indeed it was that which contributed to the procurement of the initial REAPER UAVs. In terms of the direct process and disseminate elements, we are still very much in the concept phase and should be moving to an initial operating capability in 2012 for that initial phase of direct process and disseminate, but we are already, through the UOR, process investing in the improvements to the processing and dissemination which are much needed.

Q14 Richard Younger-Ross: Are you getting the funding you want for it or is it going to be cut?

Air Commodore Gordon: As far as I am concerned we have sufficient money currently in the programme to deliver the direct process and dissemination.

Q15 Richard Younger-Ross: And the funding streams will provide for the completion of the project?

Air Commodore Gordon: As currently envisaged there is sufficient money in the programme.

Air Vice-Marshal Dixon: There is no attempt at evasion here. He has been out of the office for three weeks. I can tell you as of today that there is sufficient money in the DABINETT programme to do what we want. I would never bet against changes in programme balance of investments across the piece in the future. All parties have signed up to a defence review. I would hope that that whole endeavour of C4ISTAR in the round gets a good belt of wind in a defence review. As things currently stand

before that review, and, let us face it, all the bets are off until we have done one, DABINETT is properly funded with all the right things in it.

Q16 Mr Hancock: It takes a brave man to say that, Air Vice-Marshal, but that is why you are here. What about the manpower training and resources needed? As these developments go on and they become increasingly accurate and viable, what about the training of the personnel who have to interpret the information that is coming back? Are you satisfied that the manpower side of this, the training side of the people to interpret this information, is keeping pace with the technology advances?

Air Vice-Marshal Dixon: The last question was related to DABINETT, which, as the Air Commodore said, is a future programme currently in concept phase. In the case of DABINETT we will address the manpower defence line of development alongside all of the others, the equipment and support ones, to make sure that we do have that balance struck correctly, ie, we will not seek to take into the inventory equipment and capability that we simply cannot operate for the lack of trained resource to do that. Stepping back from DABINETT into the current space, we would be the first to acknowledge here that we have some difficulty in the pinch point trades in C4ISTAR, partly because we are coming of age in ISTAR as a Ministry of Defence. There has always been an ISTAR component in warfare right the way back to the very beginning, but I think it has now reached a point where its cross-cutting value has become so important that we are now on the front foot with it. It is as important a capability as any other platform consideration that the MoD has and each of the three Services and an awful lot of non-Service people who belong to defence are in the process of thinking out how they are going to stand up to the plate in this technical area. It is not just ISTAR. I could point to a number of other areas where these technical issues are really key. There is no absolute answer to your question other than to say that we are absolutely clear that we are going to introduce new kit, new capability, as a capability spanning not just equipment and support but also people and training, and that within the overall budgetary envelope we are operating within we will try to address all of those things to the necessary extent.

Q17 Mr Hancock: Is it a problem at the moment to get the right personnel to do this because it is a career in itself now, is it not?

Air Vice-Marshal Dixon: Yes.

Q18 Mr Hancock: And it will be a lifetime commitment in the military now in this sector, will it not?

Air Vice-Marshal Dixon: Yes, and because in some cases there are relatively small numbers of people in specialist trades; image analysts, for example. At the moment the requirement does not make a whole service, so one of the issues is to try to make meaningful career structures for people because people want to grow in their job, they want to be

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promoted in their job. This is not just the military but the Ministry and the people that belong to it, so there is an issue about branch and trade coherence and making sure that career opportunity is there for people. Because there are specialists in each of the three Services, clearly there is a cross-cutting issue as well. That is a recognised problem and it is a problem that is evident in any pinch trade, not just ISTAR.

Brigadier Abraham: We have introduced a number of measures to try and target money at pinch point trades—transfer bonuses, rejoining bounties, golden hellos and so on, in order to increase the attractiveness of certain trades in the ISTAR and other areas where we have not got enough people against those which we need. If I can just add a little bit on training, at the collective training level when you train all of the elements of a force before it deploys, usually called training and mission rehearsal exercising, we do have challenges in training for some of the ISTAR aspects of it—the low-tech bits, the bits I mentioned, for example, in response to Mr Key's question earlier. That is not a problem, but, for example, in the UK we cannot train using REAPER, the big UAV, or Hermes 450 because they are not licensed to fly in UK air space currently. That means that when we do the mission rehearsal exercise for the brigade, the task force going to Helmand, we have to simulate some of that feed to mitigate some of the problems, so you have got a mixture. In terms of training individuals to operate the equipment, yes, that is part of the delivery of a piece of equipment. The two go in tandem. You should generate your training line of development in parallel with and closely linked to the delivery of the equipment. That can be more challenging when you have urgent operational requirements because, of course, the time frame for delivery is much shorter, but by and large, yes, we do provide training, subject to the caveat that currently we are limited on some of the collective training aspects. In the future that should be better. WATCHKEEPER, for example, we hope will be able to fly in certain parts of UK airspace around Salisbury Plain from 2010.

Q19 Chairman: You said you had not got enough people. How serious is that problem? What is the percentage shortfall of people?

Brigadier Abraham: I could give you a long list which I will not read out.

Q20 Chairman: No, we do not want that.

Brigadier Abraham: You do not? How serious is it? You can mitigate part of that problem by deploying and using your smaller force more often than is desirable. In other words, you have to break Harmony on occasions and there are many pinch point trades where people deploy more frequently than the Harmony rules, which I think we have talked about before, would ideally dictate. That is one of the ways to mitigate. The second way is to try and address your manning shortfall, hence the answer to Mr Hancock's question. How serious is it? If the manning does not get better you have to push the existing force harder for longer.

Q21 Chairman: Which in itself creates shortfalls because it puts pressure on people to leave?

Brigadier Abraham: Exactly. You cannot predict the future. I think we would all take our hats off in tribute to some of the tour intervals that certain people in the ISTAR and other arenas do. This is really humbling devotion to duty. You cannot predict how long an individual will continue to be able to do that because you are asking more of him than you would normally require him to do. How serious is it? I cannot put a discrete value on it. It is a serious challenge which we are trying to mitigate by a number of targeted manning measures.

Q22 Robert Key: Why is it particularly difficult to recruit image analysts and to keep them?

Air Commodore Gordon: I do not think that is necessarily true that it is difficult to recruit and keep. If I may just step back one, my colleagues are quite right to highlight the pinch trades here, and indeed image analysts is one of them, but you have to look at it in the context of the growth of ISTAR capability that we have delivered to theatre over recent years. We are now far better placed in terms of our ability to see what is happening in that very complex battle space and that growth in capability has perhaps not been matched by the recruitment in IAs, so absolutely right, it is an area of concern. What are we doing about it? We have a number of initiatives on the people side, but we are also looking to technology: how can we make the image analysts' life easier to reduce the workload so that they can do more with less? It would be very easy to say things are bad and, yes, we acknowledge that there are difficulties, but equally we should at look what we are actually delivering as a capability these days.

Air Vice-Marshal Dixon: I think the answer to Mr Key's question has another dimension as well, and it comes down to small trade-itis. There is a danger perennially with small trades that they become backwaters where there is not a career progression, and it is a lesson for us, I think, out of our ISTAR experience now and it is a thing that our Service secretaries are very alert to, to manage this small trade-itis problem. If you are in the flying branch in the Royal Air Force, thank God, there are still enough aeroplanes to make a career out of being a pilot in the Air Force, but if these are very small trades we have to imagine pulling these people through a full career, so that is part of the problem and, as I said earlier, there is a Tri-Service component issue with this as well that we need to manage. All I would say is that we are alert to the issue. There is one other thing I would say, which is that the game never stops changing. You picked out image analysts but if you had said interpreters, and I know the Committee has an interest in that which we have explored before, just the move from one theatre to another has fundamentally changed the requirement for interpreters and the balance of languages that we need to train. You can never rule out a contingent operation growing up into a pretty permanent commitment and we have had many examples of that in our time—the Falklands, where they spoke English, Cyprus, Northern Ireland. We

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have been lucky with English-speaking places we have been called to operate in, but you can never rule out going somewhere where there is a completely different language requirement. What we need in our defence programme is strong, basic, generic training capabilities that are then reactive to events. That is what I would say. There is no absolute panacea for the right number of these pinch point folks.

Q23 Mr Jenkins: What we are talking about now is a problem which we have had for a while but it is compounded by this stovepipe approach we have had, and this is not a criticism because historically these programmes were based on different Services. Without the DABINETT programme I thought we were always going to be in a position where we had one platform collecting the information and another one re-collecting the information and it being sent down to two or three different bases and being analysed by three different crews and the same information was being re-analysed. How do we get over that if we have not got this collection point where all the information is fed in and duplication is taken out, and how much progress have we made to reduce this duplication of the collection and analysis and the workload placed on these very important people?

Air Vice-Marshal Dixon: I clearly recognise the issue you have just referred to. To some extent we are a prisoner of our past in this, of course. I said earlier that traditionally, before we really got moving with ISTAR and understanding its cross-cutting power, these ISTAR systems have grown up in single Services, often in sub-formations below single Services, and we have rather seen the ISTAR issue in the vertical where crudely there has been a collector asset, a bloke on the ground looking at a terminal who was generating the product that the stovepipe folks wanted to hear and listen to. We have made a very significant investment, currently under urgent operational requirement in theatre, to connect the whole network of ISTAR assets at the operator level, so where these platforms come down through technical stovepipes because of the legacy equipment the folks on the ground who are looking at all these individual products hitherto could not speak and collaborate with each other very readily. We have made an investment in theatre, which I will happily give details of in a closed session, which has hugely improved that interconnectivity, and that lesson, which we have been required to make in a fairly speedy way around current operations, is absolutely the heart of our DABINETT programme, to understand the need for that at the outset, and the DPD, the sequencing of DABINETT, is all about creating the infrastructure for that collaborative environment from the very beginning.

Q24 Mr Hancock: What are the problems about interoperability between our assets and other coalition assets in this field?

Air Vice-Marshal Dixon: That is a mixed picture but it is quite a good picture in theatre currently with the obvious example of total interoperability when we

see the interoperability thing in three layers. There is absolute interoperability where it is absolutely seamless, interoperability between platforms, there is operability that can be generated by a cut-out but nonetheless which is working, and then, frankly, there is stuff that is totally not interoperable but that we try to de-conflict one way or the other. At the absolutely totally interoperable end we have things like REAPER. We bought REAPER from the United States. It is a US system. The architecture of it is United States. The control system and the ground station are US. Plainly, they bought a great many of them as well and anybody else that uses REAPER in theatre can use our ground station and it does not matter. It is blind to whichever nation owns the asset, so that is a totally interoperable system. We have a very significant degree of interoperability with our non-conventional ISTAR, the stuff that we do with fast jets and some of the rotary platforms that we have, which I will happily talk about in detail later, but I do not want to share in open forum for obvious reasons. There is a good deal of interoperability at the practical level in theatre now and where systems electrically are not fully interoperable because of their legacy gestation we have, as I said earlier, with UOR investment made that connectivity as an appliqué solution on the ground which effectively steps around some of the interoperability issues that we had hitherto. I think we have made very great strides on interoperability; and interoperability is the connecting theme between very many of the UOR investments we have made over the last few years in both theatres. It has been absolutely at the forefront of our thinking.

Q25 Mr Hancock: So how big a problem is it then that there is a lack of an international downlink standard to disseminating the information that comes in across the coalition forces? If there is not a common downlink is that not a serious problem?

Air Vice-Marshal Dixon: I think not, actually, tactically, because, as I say, it is the value of the sensor that really drives this. If the value of the sensor is so great you make provision for making sure that that sensor's data gets plugged into the right ears and eyes, and we have done that. We can spend a great deal of money making these platforms talk to each other electrically and I think the UK eventually through DABINETT will pursue a common ground system approach. We are on an evolutionary path to this. If I were to set out our future agenda here I would say that because of our NEC (networked enabled capability) work we are already writing network joining rules and in the future our deployed architecture, based largely around the defence information infrastructure we are buying into now, will allow for all these ISTAR assets to connect up through one downlink into our headquarters structures. The opportunity is there to evolve along the lines you are proposing but I think the key message today is that, as we recognised as we went into Iraq and to an extent into Afghanistan with legacy capability to start with, we are where we are. We have made the UOR investments to get

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round the technical problem of unifying fully electrically that whole process and I will happily explain how in a closed session.

Air Commodore Gordon: I think we should be quite positive in some areas here as well. Clearly, we are not at that stage where we have integrated systems that merge seamlessly. What we do have, however, is a large number of compatible systems that interact, and in this sense I do not think we should underestimate the longer term benefits that we have had from NATO in terms of standardisation agreements. Link 16, that is used widely across theatre as the common data link, is an interoperable system, so I absolutely agree with you, sir, that we could be doing better but I think there are very few instances where we cannot at least interact with our coalition allies, making use of the people to make the systems operate.

Q26 Mr Hancock: So would you say then, the two of you who have just spoken on that, that the MoD is doing a lot to improve interoperability and what you have described, Air Vice-Marshal, is the biggest step forward in achieving that interoperability?

Air Vice-Marshal Dixon: Yes, exactly that. It has absolutely been on the front burner for current operations to improve interoperability. As I say, we have instant platform interoperability when we have bought into things like REAPER, but our DABINETT programme is another opportunity. I think the Air Commodore is quite right. We have been very good at this in the air and I think it is probably true in the maritime domain as well. That has been because of the NATO background to what we have been doing. There has been a multinational component in our thinking for very many years. That has evolved through the equipment programmes of a number of different countries. I think putting the whole thing together, under the pressure with the enemy voting in both theatres now, has driven further requirements. We are being informed all the time by lessons learned. The UOR work we have put in theatre now has been very successful already and I will happily talk about that in detail later, but the key thing for the future for us is to make sure that our DABINETT investment is absolutely at the DPD interoperability kind of wavelength from the beginning, and it is.

Q27 Chairman: What is the timescale for what you were talking about in the defence information infrastructure and getting this interoperability as good as you would like it to be?

Air Vice-Marshal Dixon: I do not think there is ever an end to the curve of improvement in this business. We will always be chasing a higher target; it is just the nature of the business. The DII issue is just where we are going. We have a unitary network coming into play; it is already rolling out around our headquarters, it is very substantially rolled out already. It is going into the deployed space next year. We have in the interim invested in a project called OVERTASK in Afghanistan, which is the UK-funded component of a wider NATO architecture which is funded through the coalition, and we are in

the process of evolving a new deployed technical architecture to replace the early rollout of OVERTASK which will use DII compatible capability, so we already have an eye to this unitary network being an enduring requirement in theatre. The other thing I would say is that we recognise as well that the user community in theatre are now very comfortable with working at that NATO classified level and that we need to do quite a lot about the accreditation and management of our network to make sure that we do not bedevil progress in future with eyes-only issues that relate to the ownership of intelligence products in the UK or in less than the full NATO coalition. We are on that case as a department very firmly. We have just appointed, as you probably know, a new Chief Information Officer for the first time in UK MoD and the operational staffs in PJHQ who deal with signals and communications are collaborating with us in London under the Chief Information Officer's chairmanship to make sure we grip the "deployed technical architecture" thing to deliver that unitary network. The answer to the Chairman's question in detail is that it is a bit of a moving feast, Chairman. The DII programme is a little bit ahead still in terms of the deployed piece but we are bridging between now and then with a unitary network in which we have invested UOR money. In the end I think that once DII (Future Deployed) is fully installed and working we will have that unitary network and then be able to capitalise very heavily upon it and add to it as well in emergency.

Q28 Mr Hancock: So what would you say the actual impact has been of the Urgent Operational Requirements process in developing ISTAR and bringing it forward and giving the right procurement process in line?

Air Vice-Marshal Dixon: I will start the answer to this. Urgent Operational Requirements, plainly, in the context of our current operations been hugely important but they have in the past as well. The truth is that there is a place for the Urgent Operational Requirement process alongside what I would call a more conventional planning process. Often, I think rather naïvely, some people think there is a choice to make between the two. It is not really—although it is only my judgment—like that. Part of the pleasure of an urgent operational requirement is that quite a lot of rules that would normally apply to things like competition are set aside in the interests of getting the equipment into service quickly; but, quite obviously, over a period of time if you just relied on a UOR process you would end up depriving yourself of the pleasures of competition in terms of cost effectiveness, so my own instinct is that the equipment programme and the programme more broadly should be used for bedrock capability and we should be trying to build architectures, particularly in ISTAR and in communications, out of the equipment programme which give a robust base level capability across the whole span of our endeavour. We should always recognise that we are going to have to put icing on the cake in a number of areas because the enemy is voting uniquely in one

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place or there is some particular technical challenge that emerges. The UOR process is perfect for getting on to that really quickly, analysing the problem and actually skipping all of the usual MoD stuff that tends to slow our processes down and actually getting to the heart of the problem, but I do not see the two really as mutually exclusive. You need both and the MoD is actually quite good at managing that balance—that is a personal view—particularly in light of current operations.

Q29 Mr Hancock: What is the time frame from somebody requesting this through Urgent Operational Requirements to it actually being delivered?

Air Vice-Marshal Dixon: There is not a hard and fast set rule. In broad terms, as you are aware, the Treasury pay for UOR capabilities, it does not come from the defence budget. The working rule is that it must be deliverable within 18 months of the requirement being raised; if it is beyond that then it is not in the game of being urgent. There is a degree of flexibility in that and sometimes they are delivered faster, but 18 months is about the working time frame as to whether it fits the UOR category or not.

Air Commodore Gordon: Can I perhaps highlight by way of example the success of the Hermes 450 unmanned air vehicle, which of course is a huge success in theatre. That took seven months from the requirement reaching the desk to it being fielded in Iraq for the first theatre and a couple of months later it was in Afghanistan. So we can move very quickly.

Q30 Chairman: Thank you. Some good news stories; would you forgive me if I came on to some bad news stories? On 1 June there were reports in the *Telegraph* and *The Times* that Soothsayer, a ground-based electronic warfare system, may be abandoned, that Project EAGLE, a sensor upgrade to the Sentry Airborne Early Warning Aircraft is being postponed saving £400 million, that the REAPER UAVs acquired under the UOR process will not become permanent assets, and *Defence News* has suggested that the order for Nimrod MRA 4s will be reduced from twelve to nine—and I would remind you that the original order was 21—and that will save a lot of money. It was also reported that the decision on whether to procure a replacement for the Nimrod R1 will be delayed indefinitely, saving something like £400 million. Do you want to comment on those reports and, if ISTAR is so important, why are there so many reports suggesting that ISTAR programmes are to be cancelled, delayed or cut out entirely?

Air Vice-Marshal Dixon: I know quite a bit about all of those programmes, as you might imagine, and I do not think it would be helpful to get into too much detail about some of them for reasons that are plain, but let us pick them off in roughly the order you enumerated them there. I am not able to talk about Soothsayer for commercial reasons; we are in commercial discussions with a legal component with the company about that and I am not at liberty to talk about that now, but I can confirm that we have cancelled the Soothsayer programme. The thing I would just say parenthetically about that is that we

are not doing that, as was reported in the press, to the detriment of current operations. We are entirely satisfied that we have analogous capability provided by a different platform in theatre, doing what it needs to do for our folks currently. The issue about Soothsayer is that there will clearly be a debrief moment for the Committee in due time, but I am not able to talk about that.

Q31 Chairman: Are you able to say when?

Air Vice-Marshal Dixon: No, I am not. The elaborations of those negotiations I am not personally party to, that is a DE&S issue with the Chief of Defence Materiel in play now, but because of the sums of money that have been expended through the UOR I am sure there will be an outing of the issues, but not yet. On all kinds of Nimrod—let me deal with the Nimrod R1 capability first of all. I know that has been reported in the press as well but we are still in assessment phase for the replacement of the capability and the only thing I would say in the public session—I am happy to elaborate a little bit in the private session—is that we have no intention of gapping that capability, i.e. we still have a very clear requirement for a manned capability which Nimrod R1 provides for the UK. It is very important to our current operational model that we have that capability and we wish to retain that capability in some form in the future. We are looking at a number of different approaches to delivering it; it is no secret that one of those is a potential for BAES to do something to the aircraft as an upgrade to the Nimrod R1. One of the other ideas that is being examined is to buy into an American programme called Rivet Joint, but either way we require the capability, we are crystal clear on that. On the other Nimrod axis which is largely to do with our antisubmarine warfare capability the actual numbers have gone down, as you say, over a period of years from 21, from recollection, down to the numbers now. We have an extant contract with BAES for nine aircraft and are considering but have not yet committed to a potential for a further three aircraft above those. The actual deliberation about what is enough capability in that area has been a moving feast for, certainly to my recollection, some years. I am personally pretty new to this business—I have been in my post just less than a year—but as of now I am satisfied looking at the likely range of missions and tasks for that capability that we are going to be able to cope with enough of the tasking set.

Q32 Chairman: Is it because the number of Russian submarines in our waters has gone down?

Air Vice-Marshal Dixon: It is fair to say that the perspective of range and task for that capability has varied over the time because of perceptions of threat globally. That is part and parcel of it.

Q33 Chairman: Do we ignore the recent Russian announcement about increasing the number of ballistic nuclear submarines in their Northern Fleet?

Air Vice-Marshal Dixon: Like every other threat assessment across the planet we keep it under review. There is probably, going through time, no absolutely

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right mix for any of that. As I say, we are still in discussion about whether we are going to increase beyond our current programme for nine aircraft and the international threat assessment and the range of missions and tasks will be one deliberation to get into.

Q34 Chairman: Do you think if you spend less money on a threat that reduces the threat?

Air Vice-Marshal Dixon: No, I do not think that, I just think that these things have to be kept under review. As things stand today we are probably buying into a fleet that will do all that is required of it. That is not to say that you cannot use more aeroplanes if you get them, but we are into absolute territory here.

Air Commodore Gordon: There is also a danger of focusing on the platform, the collector. Clearly as technology moves forward the sensor capability that you can put on those platforms improves so it is potentially possible to do more with less platforms and that wide balance has to be factored into any debate when you start considering pure platform numbers.

Q35 Chairman: Let us move on to Project EAGLE and the REAPER UAVs.

Air Vice-Marshal Dixon: Project EAGLE and the detail of it you can speak to. All I would say about EAGLE is that in the current issue, that capability is essentially in a contingent area. It is a matter of record that we have not had a major air campaign to fight peer on peer narrowly around Iraq and Afghanistan. That is not to say it would not emerge in a different context, but we have not been up against air peer enemies in those two theatres and consequently that capability has not been fully on the front burner in terms of operational requirement. Had it been perhaps the situation would have been different in balance of investment terms, but I would just point out that that EAGLE capability in the scheme of our current things is not right up at the top of our priority list. That is not to say that we do not need to keep it moving against contingent issues but the EAGLE capability has been renamed to be SENTRY SUSTAIN and the clue is in the title there, that is our assessment of the requirement, we need to sustain the capability as it currently is. It is a very significant capability, even in its current state, and we need to make sure we manage its obsolescence. There are a number of issues in the aircraft—it is quite an old design and we have had the aircraft in the inventory now for quite a long time. There are things that we need to do in obsolescence management of the aircraft; I can think off the top of my head of Mode S, IFF—Indicator Friend or Foe—that is a generic requirement for aircraft flying in regulated airspace to have that Mode S capability, and it is not a trivial matter to upgrade the aircraft to have it. That is in the programme. There are a number of issues relating to its internal mission system which are obsolescent, simply because the components that were delivered originally are just not able to be sourced any more. They need to be swapped out, that will be dealt with in the programme and there are other technical issues relating to the communications on the aeroplane which also have obsolescence issues. So we are

managing the capability through an obsolescence kind of management prism rather than trying to major it as a front burner operational aircraft currently. It is an important contingent capability that needs to be kept up to speed, and that is really what we are doing with the programme.

Q36 Chairman: Do you think all of this will have an impact on our capability in ISTAR terms—the reduction in the number of platforms, the reduction in the amount of money that is being spent on these issues?

Air Vice-Marshal Dixon: The Air Commodore has already elaborated—and I did earlier myself—on this balance of investment you need to make between platform numbers and DPD. Plainly there eventually comes a point where the platform numbers reduce to a point where you cannot cover the ground—that is the absurd situation. It is a question of balance though in all things. I would never say we have had too many platforms in the past and we are a prisoner of our past in that sense, but there is further investment to make, as I have said we will make in DABINETT, to improve the DPD component of that and, in the end, the numbers of platforms that are going to be on the inventory will steady down. There is probably in the end going to be a ratio that we will arrive at, but I would not like the platform numbers to reduce endlessly because clearly we are going to end up in trouble if that happens, but we can still increase the leverage of individual platforms by some careful investment in DPD—I think that is what the message is and I am not sure we have reached that sweet spot yet. I am therefore not yet able to say to you that we have reached the bottom line on platform numbers.

Air Commodore Gordon: The media reports of what was almost described as large-scale cancellations of ISTAR projects have perhaps been misinterpreted or perhaps not reflected truly. As the Air Marshal says, the requirement for manned, airborne electronic surveillance remains and that programme will move forward. Similarly, the ASW capability of MRA4 is being delivered. In terms of the airborne early warning that was to have been provided by EAGLE, that programme continues but we are just approaching it from a slightly different procurement strategy. All this has to be set in terms of what are the priorities in support of current operations and are there contingent capabilities that we can perhaps move slightly further out.

Q37 Chairman: I will tell you what worries me about this, and that is the gradual reduction in the number of platforms. Each new platform that goes—yes, you cannot say that it will make a huge difference but as gradually it goes down you do not notice the fact that a major capability is actually being affected. I am not getting the impression from you that you know where to stop—do you know where to stop?

Air Vice-Marshal Dixon: The first thing I would say is that we are not on some preordained agenda to keep reducing—I am certainly not. In the end the arguments that my staff will advance—we will see where we go; I advance an argument and other people will conclude upon it. If I think there is a requirement

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for a minimum number of platforms I shall say so quite openly and our business case submissions are flavoured with that all the time. There is always a balance to strike between the absolute capability of any particular platform and the number of them; there is a ubiquity issue for air platforms. For example, it is a fact that a Nimrod cannot be in two places at once so, you know, foolish games played with attributions to say that that Nimrod could be in four theatres at once are plainly stupid, and we would say that in our business case. There is always, and properly should be, a tension between a bloke like me in an RAF uniform asking for umpteen Nimrods and the overall cost to defence, and there is a balance that rests between the two. That is a healthy tension which I am certainly very comfortable to make my pitch in, but there is no agenda to continuously reduce the number of ISTAR platforms—in actual fact the number of ISTAR platforms has increased overall. We are talking about future plans with Nimrod; we were where we were with Nimrod MR2 and MR1 because of the Cold War world we were working in; it is a different world now. Plainly the number at the end of the Cold War could have reduced, decently so, and we have done that. I do not think there is anything wrong with that, but if we ever needed to go up again I would be very happy to argue for more numbers.

Q38 Mr Havard: Could you just answer the question about REAPER in particular? The report is that it is not going to become a permanent asset.

Air Vice-Marshal Dixon: That is really to do with thinking about what our long term objectives are for DABINETT and what we need of a core asset in our core programme. We are committing ourselves a bit if we put REAPER in the core programme to either a future that, should we wish to increase the number of those kinds of assets, is more REAPER; or if we chose for example to do anything in either a UK or European or other collaborative perspective, we would end up foisting upon ourselves more than one platform, potentially bedevilling our support organisation with a requirement to fly two birds for one job.

Q39 Chairman: I am sorry, I did not understand that, you are either committing yourselves to one or you are committing yourselves to more than one. I understand that, but you are going to have to do one of them, are you not?

Air Vice-Marshal Dixon: Let me elaborate my answer because I do not want to confuse the Committee at all. I said earlier that we have yet to start our assessment phase for DABINETT. I think we will go to initial gate and commit to assessment phase in the New Year—we are still in concept phase for DABINETT now. I want the assessment phase in DABINETT to home in on this very issue. I explained earlier that one of the components of our DABINETT programme is a new unmanned air system to do what we call a deep and persistent collect capability and we see that unmanned air system even at this early point, even in concept phase and not yet confirmed by assessment phase, as a medium altitude long endurance unmanned air

system. REAPER is one potential candidate to meet that commitment but there are others—not least we have a research and development programme ongoing currently with BAES on a programme called MANTIS, so there are choices to make in the end about what we want to do onshore. There is an industrial component to it for sure and, in the end, there is a functionality component, there is a range and payload component and there is an issue as well about whether we want an aircraft that can just operate in unregulated airspace because of the safety case it has, or maybe the potential to try and find an aeroplane and a system that can operate in more regulated airspace. Either way, between those two—and probably more choices as well—we need to elaborate the choice carefully in the assessment phase, so we are not going to put REAPER into the core programme lightly now because I do not want to saddle us with a decision that I might want to unpick in an assessment phase for DABINETT. In a sense I am playing for time here; we will look at that whole issue in the assessment phase for DABINETT in detail and I do not foreclose any choice out of it, including taking REAPER into the core programme.

Q40 Mr Havard: Can I ask you two questions related to that then: to what extent is the fact that REAPER is a weaponised system and you are talking about intelligence-gathering—those two things mixed together, is that a component in your thinking, that currently it is a weapons system as much as it is an intelligence system? You may of course want simply an intelligence system, and in building all of those things to what extent is the scarce commodity and the expensive commodity bandwidth a feature in doing all of these different things?

Air Vice-Marshal Dixon: I will start the answer because we are where we are with REAPER. REAPER started its gestation as an intelligence-gathering aircraft only and then, subsequently, through a number of evolutions, it became a multi-role aeroplane, and it is part of our instinct that multi-roling, particularly as a medium power as we are, is a good idea if you can do it without technical compromise. We have made no decisions at all yet about whether we are going to put a weapon on our medium altitude long endurance UAVs which we see ourselves buying as part of the DABINETT programme, and we will look at that whole dimension when we do the assessment phase. My own opinion—and it is a personal opinion—is that that genie is out of the bottle and if ever I advance an argument in the future that we probably would not at least wire up the aircraft for weaponisation, stand fast whether it would actually carry the weapons, people like you would probably be saying you are missing a trick.

Q41 Mr Havard: Where are you going to put the gun is the first question you are going to get.

Air Vice-Marshal Dixon: I say that as a personal issue but, getting back to the assessment phase, there is a cost associated with doing it and, in the end, I am quite clear that the piece we need to secure for

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ISTAR is more about trying to package up a number of different sensors and interoperable sensors within a platform, rather than buying umpteen different platforms each with a specialist sensor. That is the real lesson for DABINETT and we have already started learning that lesson. To take a real world example, we went into theatre in Afghanistan with Hermes 450 which only carries a single sensor; we are about to go into theatre with our own WATCHKEEPER programme with a multiple sensor capability on one platform. That is a big lesson and we will take that lesson through the assessment phase, I am sure.

Q42 Mr Havard: What about bandwidth in all of that?

Air Vice-Marshal Dixon: Bandwidth is a real issue and we constantly worry about bandwidth. I read on an American website this morning in preparing for this thing that the Americans four years ago reckoned that in five or six years their bandwidth requirement was going to go up eight times. We are very, very well aware of the bandwidth issue and demand for bandwidth is growing all the time. We have a number of programmes running in our C4 empire which are clearly not part of the detail today which will look at that whole thing—it might be something that the Committee wants to return to later but I have not got the right staff with me to give you detail on bandwidth. Is there enough bandwidth for our immediate plans? Yes. We have a major satellite programme, as you know, called Skynet 5. We have a requirement at the moment for less than a couple of those satellites' capability, but we have launched a third satellite that is in orbit as a spare and we are thinking about further satellite coverage as well. That is one example of where our instinct is, that we need to make provision for additional bandwidth, but it is a thing that we have constantly under review and the bandwidth requirements are going to be part of our normal auditing process for approvals. Whenever we take through any network enabled capability related activity through MoD, it is an absolutely essential prerequisite before approval that we have enough bandwidth covered.

Q43 Mr Havard: More commonality on bandwidth might be more important to you than sticking a weapon on a particular platform.

Air Vice-Marshal Dixon: To take that example, if I could not demonstrate to collective satisfaction that we have enough bandwidth I would not get my approval so, plainly, it becomes a self-limiting exercise.

Q44 Mr Havard: What is the sequence of timing between all of those considerations and the existing assets of REAPER and a decision about whether you are keeping it or not keeping it?

Air Vice-Marshal Dixon: I am not sure I understand the question.

Q45 Mr Havard: You say the DABINETT thing is going to go forward and you are talking about how you are going to enter into this discussion you are

going to have with various people about doing this. How does that fit with the decision about REAPER, both current stuff that you have got and any decision about buying new, replacing it or upgrading it?

Air Commodore Gordon: REAPER, without doubt, has been a huge success on current operations so in terms of meeting the current operational requirement it meets the need. The wider decisions on the operational UAV—yes, we have the requirement. Because of that wider industrial piece that the Air Marshal referred to, I suspect it is something that will be tackled within any future Defence Review—I just cannot see that we are going to be able to move forward without that wider overlay. That would be my instinct.

Q46 Chairman: Can I get back to asking some people questions? To what extent do you rely on reservists to deliver ISTAR capabilities?

Brigadier Abraham: Shall I answer that one? As you know the reservists make a vital contribution to deployed forces in Afghanistan and they are employed in a huge variety of roles. That would include playing roles in organisations such as the brigade reconnaissance force, the close reconnaissance platoons and so on. The UAV batteries operate Hermes 450 and Desert Hawk and so on, so in terms of generalists it is huge. In terms of the pinch point trades—because these are all small trades as the Air Marshal talked about earlier—the effects or the contribution of reservists in support of the small trade specialist gaps is much less.

Q47 Chairman: Another people question: you recently deployed some naval assets, Nimrod MR2A, Sea King MK7 to Afghanistan. Has that reduced the readiness of the UK's naval forces would you say?

Air Commodore Gordon: We have to make clear the distinction between what are naval and air assets. Clearly, in terms of the Nimrod the primary task has to be the protection of the UK base so any decisions on deployment always take that primary task into context. The assets that you refer to are principally aircraft capable of providing organic—in other words based from the ship—airborne early warning, but they do deliver with it very significant capabilities in the overland role as well, hence why the decision was taken in that context. It would be true to say, however, that there has been no direct diminution in UK capability that has not been fully factored into whether we could or could not deploy.

Air Vice-Marshal Dixon: If I may, I also think that the Navy would be very irritated if I did not make absolutely plain to you that they are very involved in current operations themselves and those ISTAR assets that you referred to have been working very hard for them in the prosecution of their contribution to the campaign. For example, until we recovered the aircraft back to the UK for some repair and overhaul, until very recently we had a couple of Nimrod MR2 aircraft—that is the normally Navy attributed RAF aircraft—working out of an Air Force base and largely prosecuting support for the Royal Navy in a deployed sense, so

they are out on parade as well with their ships, submarines and other capabilities and our collective ISTAR assets are doing their thing for the Navy as much as they are for land forces.

Q48 Chairman: I have seen what the Sea Kings, for example, do around the coast of this country and they are, I would expect, doing an extremely effective job in the land environment of Afghanistan, but that means that they are not doing the job around the coast of the United Kingdom.

Brigadier Abraham: Can I answer that? If we go back, please, to the recuperation session we had in February, without going through the areas we highlighted where we think there are significant risks against our contingent force structure we did make the point that we, defence, have been operating consistently above the planning assumptions for which defence is resourced, programmed etc. While that is mitigated by UOR, that does not cover all of it and we have described to you in the past where the more important risks we face are. Nevertheless, we are doing this against the criterion that success on operations is our driver although, as Air Commodore Gordon says, there are certain things that we will not take an absolute risk against, we will have to manage it.

Air Commodore Gordon: If I may just clarify because your question may suggest that you have a nervousness around the search and rescue force—is that a correct interpretation, sir?

Q49 Chairman: Actually, no, my nervousness is around the surveillance of vessels coming near the coast. The search and rescue force is a completely separate unit.

Air Commodore Gordon: Absolutely, I just wanted to clarify that.

Chairman: Before we get into the question of a single ISTAR command and control structure, David Hamilton.

Q50 Mr Hamilton: I have a people question. I was referring back to some of the notes and some of the answers that came earlier on and it puzzled me a wee bit. Apparently guidelines are being broken because people are being asked to work longer because of pinch points with personnel—you have not got enough personnel. Major companies, when they are going through a difficult time, subcontract work out. Is it not possible that with the new technology that is being brought in, some specialists are not brought through to try and alleviate that problem in the short term whilst also trying to resolve the longer term problem of maintaining personnel?

Air Commodore Gordon: There are quite a few areas where we have explored that already. The Hermes 450, by way of example, is largely a contractor-managed service; similarly, there are certain aspects of the linguistic skills again that we are looking to see whether we can contract, so it is an avenue well worth exploring and indeed we have explored that in a number of areas.

Q51 Mr Hamilton: As long as it is only meant on a short term basis because I do not think that would resolve the long term issue.

Brigadier Abraham: Absolutely, that sort of thing tends to be a stopgap, a mitigating measure, rather than this is our preferred way.

Q52 Chairman: A question has arisen whether there should be a separate ISTAR command and control structure in theatre, in the operational theatre. What do you think of that, what would you make of such a suggestion? Would it have advantages, disadvantages or what?

Air Vice-Marshal Dixon: I am going to let the Brigadier start the answer to this because it is only proper that the operational staffs kick this off, but I have got some views which I will put in at the end.

Brigadier Abraham: There is one commander in ISAF, General McChrystal. The way that he devolves command is clearly a combination of training, equipment and other things but the principle of unity of command is an important military one which I will stress here. A separate ISTAR chain of command, a rival or possibly divergent chain of command, is not something that we would envisage, it would not be workable.

Q53 Chairman: No, it would have to be under him.

Brigadier Abraham: In a sense you have that because responsibility for ISTAR is like responsibility for manoeuvre, it is a function of command, so commanders at the regional level and commanders at the taskforce or provincial level have to command the ISTAR assets that are organic to them and they also have to take part in a broader coalition—the ISAF-managed provision of ISTAR which is part of the ISAF pool rather than organic. As you know already we have some UK assets which are declared to ISAF and are, as it were, in the pool for tasking by the ISAF chain of command. And there are others which are specifically for UK operations. So in a sense we have a chain of command and ISTAR is a core part of the responsibilities of the operational chain of command. There are delegations of responsibilities at each level of J2, ISTAR, Battle Space Management and other staffs, people who enable and support commanders in terms of that function, but those are supporters or enablers of a critical function of command, ISTAR.

Air Vice-Marshal Dixon: If I may, Chairman, what I would add is that this is a hot topic. This particular question is a hot topic at the moment.

Q54 Chairman: Why?

Air Vice-Marshal Dixon: Because of the complexity in theatre, not just of getting our joint story in the right shape but also the coalition story in the right shape and recognising that these assets are held at different levels as well makes, operationally, for quite a busy planning problem. The way that is addressed, certainly on the air side, is pretty intelligently done in theatre. The stuff that is held at the operational level, because it is very high value, wide area surveillance et cetera, is managed through what is quite an elegant process in theatre with the Joint Intelligence

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Operations Centre which is funded and largely led by the Americans in Kabul, pulling together the big tasking requests for these high value assets from across the whole country. The assets are then allocated and once they are allocated for a particular operation the command and control is then vested in the local commander. That is a well-ordered and well-oiled process on the air side that has not just been invented for Afghanistan, it is an enduring thing and has been going on for years. The Combined Air Operations Centre in Al Udeid has a very big role to play in pulling that whole story together and the functional expertise within that CAOC is very broad indeed. The layering effects and the ability to choose the right tool for the right job, all the expertise is in that place. That stuff works quite well and, as the Brigadier says, the stuff that is left at the tactical level and where it properly should be left is just managed in the normal chain of command of those formations as it should be. Where there is more complexity is in the networking component of it and in the peacetime space and back at home we have gripped some of this complexity by making a Chief Information Officer responsible for quite a lot of this stuff. I sense myself from visiting theatre that there is sometimes a need for that kind of role in the Coalition. It is not just the command and control of ISTAR assets—that is one part of the story—but there is a need to make sure that we recognise the weaknesses of our policy. The perfect world would be to have somebody who never needed refreshing back at home and to send somebody forever to the theatre until the job got finished, and then you would never have to worry about lessons learned, but we need to avoid the saw tooth effect where units come and go from theatre and big, important lessons are lost. There is something about a Chief Information Officer role in theatre that probably needs to be looked at. All I would say for the Committee today is that PJHQ is studying that whole thing in consultation with allies and is thinking about it very deeply, but they recognise the point that underlies your question.

Q55 Chairman: Did you say in consultation with allies?

Air Vice-Marshal Dixon: Yes.

Q56 Chairman: Actually this will be an American decision, will it not?

Brigadier Abraham: They will have the biggest share because they are the biggest providers.

Q57 Chairman: They will have the biggest say.

Brigadier Abraham: Yes.

Q58 Chairman: What is their view, if you can tell us?

Brigadier Abraham: Their view specifically on what?

Q59 Chairman: On a single ISTAR command and control structure in theatre under General McChrystal?

Brigadier Abraham: I am not aware of their view.

Air Vice-Marshal Dixon: I think he has one, does he not?

Brigadier Abraham: As you appreciate, General McChrystal, relatively new in post, has been conducting what has been called a 60-Day Review, which is coming to an end now, and that is basically his assessment of the situation and how he wants to meet the challenges in that. That is something that might emerge quite soon, what his view is. As the Air Marshal mentioned, PJHQ are in any case doing this review of the UK's ISTAR contribution so it might be that that is a question worth posing again if you have another session in October when you have PJHQ representation here as to what has happened since then. A big driver in this now and for the future, rather than what has happened, is what General McChrystal directs and requires out of his 60-Day Review.

Chairman: Okay, thank you. Brian Jenkins.

Q60 Mr Jenkins: I know this is covered, but just to get an assurance, I can understand the overall view being centralised across Afghanistan but when you have got units changing round and the technical commander in that particular area comes in, I am sure they have got a situation where they just come in and plug into the system and they are not going to start calling up for new images or new areas, they can review all the lessons learned. When I asked before the operators could talk to each other but I would like to make sure that the commanders can talk to each other across the piece as well at their technical level rather than the strategic level, if you know what I mean, so is it possible that they can come in and plug into the system automatically?

Air Vice-Marshal Dixon: I just want to make sure I fully understand your question. Are you referring to the ability to plug and play in a communications sense in theatre or in an ISTAR sense?

Q61 Mr Jenkins: ISTAR.

Air Vice-Marshal Dixon: With the investment we have made—and as I say I will happily elaborate in detail offline if I may, Chairman—you can. We have made the necessary communications and IT connectivity to enable that to happen and it is not just at a national level, it is at a multinational level, because that is a NATO-wide area network that I am talking about.

Q62 Chairman: And people are trained on it before they go out to theatre are they?

Air Vice-Marshal Dixon: They are, and that is another big change that I would point to. We recognise that until pretty recently because of the way our roulement cadence was running we were getting people pretty much to the point of departure for theatre without really adequately addressing that issue, largely because the in-theatre infrastructure was changing so rapidly. We recognised that issue and we have made available out of the equipment programme a facility at Shrivenham which we have made available to PJHQ where we have effectively relocated the in-theatre IT network and we have also made provision to keep updating that too. Visiting that facility is part of the pre-deployment battle procedure work-up training that deploying brigades

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go through. That is working very well and that was a very good example, if I may say so, of a piece of the equipment/staff world rising to an occasion that needed very quick action, and that is working quite well. That is not to say it could not be improved and if I had to elaborate an improvement I would love to have that replicated network available in pretty much everybody's office space in all of the locations that the Army, the Navy and the Air Force operate. Plainly that is not yet possible, but it will be with the DII Future that we have funded because we are already largely on the same page at the business space end of our business and, as I said earlier, we are going to have this deployed component of DII. When that is all running we can then host all of the operational applications—if you like the toolset for operations like you would use Microsoft Office at home and there are a number of other icons that exclusively belong to the military. We can host those icons and the applications on our unitary network and so, in effect, enable training anywhere in the MoD domain. Currently we are not quite there yet because DII is still rolling out.

Q63 Richard Younger-Ross: How does the MoD intend to measure the performance in achieving an overall effective ISTAR capability across the individual ISTAR platforms?

Air Vice-Marshal Dixon: If I may come in I will start. Measurement—we take soundings of how we are doing in a whole raft of places and try to build a collective picture. If I could start with programmes. As you would expect we have numbers of measures of effectiveness of our programme performance—as a programme rolls out we have a whole raft of management information that the IPTs and the folks in London put together so that we can manage effectively the process of first of all identifying our key user requirements, seeing the programme roll out and then check finally that our key user requirements are met before we then introduce a piece of kit into service. There are all kinds of programmatic measures that allow us to make an ongoing assessment of programme performance before stuff hits the operational streets. After stuff has hit the operational streets we are very much then dependent upon the advice of users as to how the kit has performed and we have made a pretty big science actually in defence now about our lessons learned process. To take some current examples, at the end of every tour interval for a deployed brigade in Operation Herrick, we get a very fulsome post-operational report from the command staffs in the brigade and the format for that report covers a whole raft of people, operational and technical issues including ISTAR and we are greatly informed by that. PJHQ, in the process of informing my staff on the equipment planning side, provide for us annually, as part of our annual planning process, a list of prioritised requirements which they would like to see evoked through the programme. That used to be called the JOPL.

Brigadier Abraham: The Joint Operational Priorities List.

Air Vice-Marshal Dixon: Joint Operational Priorities List, so that is heavily flavoured with the views that PJHQ senior staffs have taken from their own collection of operational reporting. That document is very influential in where we prioritise our equipment spending each year. The other thing is that he personally¹ has a role to play in my world because he is the keeper of the flame in that there are a lot of operational threads to pull together in all of this story and there needs to be a little bit of cat herding to make sure that there is an intelligible stream of data coming in rather than white noise, and I look to his staff to actually provide mine with some insightful distillation of really what the lessons learned process is. The last thing I would say, before I hand over to him, is that we have an organisation within the MoD called the Directorate of Operational Capability—he is probably called the Head of Operational Capability now under the new post titling—and that is an organisation that was set up originally under the Secretary of State to effectively do targeted audits of operational capability and, to take an ISTAR example, the Head of Operational Capability as recently as last Autumn, I believe, did an operational audit of ISTAR in theatre and produced a report which we have all read from cover to cover, so we have a number of ways of putting our finger on the pulse of how we are doing. In summary, programmatically through the normal business of programme evolution and then this very intricate web of operational reporting we get synthesised into a common picture through PJHQ at the senior level and through special audits we do with DOC.

Brigadier Abraham: If I might add a little bit more on the operational lessons reporting process 30 days after taking command of Task Force Helmand the incoming brigade will submit a first impressions report. As the Air Marshal says, at the end of their tour—and these are considerable documents that are submitted—each unit and battle group will also do the same, so there is a lot of push of lessons identified. Where do they come to? They come into the Ministry of Defence at my level, my directorate, at the Permanent Joint Headquarters who are responsible for the operational level lessons and into each of the maritime land and air warfare centres who deal with things pertinent to each of those services. That is the big push. Those lessons identified then have to be addressed or assessed as being incapable of being addressed—this is the generic, not just the ISTAR process clearly—and they are periodically reviewed by two 2 stars in the Ministry of Defence who are known as the gatekeepers for the whole process. This is an elaborate and constantly changing process to draw on operational experience. It has ISTAR flavour to it, of course, but that is the generic process.

Q64 Richard Younger-Ross: Under the Defence Technology Strategy 2006 we were told that they would put in place a plan to meet stakeholders'

¹ Note by witness: the witness is referring to his fellow witness, Brigadier Kevin Abraham, Head of Joint Capability.

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needs across the board. Do you have a clear definition of what the stakeholders' needs are for ISTAR to measure performance against?

Brigadier Abraham: Yes, and in the jargon of stakeholders and so on for the operation the principal stakeholder is the Permanent Joint Headquarters which articulates to the Ministry: this is what we think you require in support of the operation, and they do that by a process called the Theatre Capability Review which runs every few months, involves extensive visits to theatre, analysis back there and then a recommendation to the operations and security policy staff in London which, depending on the nature of the recommendation, can either go to the Defence Board, the Secretary of State or is resolved at a lower level. So in terms of the big stakeholder for the operation in Afghanistan, that is how the Permanent Joint Headquarters deliver.

Air Vice-Marshal Dixon: If I might add a little bit of MoD end colour to that, we have over a period of the last two or three years introduced a heartfelt concept called Through Life Capability Management—I know you are aware of these phrases in the Committee—and one of the things we have done in that TLCM process is we have invented a way of deliberating our collective ideas under a concept called “the unified customer”. Whereas before we rather saw things in a frontline versus MoD staff sense and there was a polarity there which was not really helpful at the point of delivery, we now have arranged our management processes within the equipment staffs to draw together all of the components of the customer base from DE&S in the sense of buying equipment and generating the support system for the equipment and the frontline, both in a single service sense and also in a PJHQ sense and obviously the Brigadier's leadership of that team. Each Head of Capability for Equipment, of which Air Commodore Gordon was head of the ISTAR bit, has the chairmanship of a capability management group, planning groups and programme boards which actually pull this unified customer view right the way through what we do and think. For example, the capability management strategy for ISTAR which the Air Commodore wrote before he left has been rinsed out fully with all of that frontline community so they have a co-ownership of our future vector for investment which they never had in the past because they were not really properly consulted.

Q65 Richard Younger-Ross: Of the ISTAR capability what sort of percentage would you say the capability is compared with the potential for the platforms? Obviously we are not achieving because you still need DABINETT and you still have other programmes to improve the capability but of the existing platforms we have got how much use are we making of them? Are they 50 per cent effective or can we improve it?

Air Vice-Marshal Dixon: We have not got a measure that is going to give you an answer that I would be proud of to that question. The answer is we will always be able to do better with squeezing the last drop of capability out of everything. We have a big twist on that squeeze already with the investment we have made in UOR to connect our stuff together and, therefore, the productivity of the assets we have got has hugely increased as a result of that and it will continue to increase as we invest in DII and in the future. We are therefore on a journey of improving the productivity but we should not be too frightened of our own record historically. We have got huge value out of our ISTAR investments in the past. I think back to the Cold War and the Chairman's question earlier about Russian submarines; we were all over that issue with our legacy capabilities many years ago and we were pretty good at it—we were world-leading it in fact. It is not in the instinct of the military to underuse a capability in any sense, the issue is can the technology deliver further benefits? We have just reached a point in the evolution of technology where we are able to go another step ahead of where we have been in the past and that is really what we are talking about now.

Q66 Richard Younger-Ross: Is the tendency of the Treasury not to fund you the programmes like DABINETT to stop you realising that capability?

Air Vice-Marshal Dixon: I explained to you earlier that we have got funding. I will be the first to say internally if that DABINETT investment is imperilled to deliver the capability I want. You can trust me to do that internally.

Chairman: On various occasions you have said that there are things that you could tell us in private that you could not tell us in open session. Does the Committee agree that we should go into private session?

Mr Hamilton: Yes.

Mr Jenkins: Yes.

Mr Havard: Yes.

Chairman: The Committee will now move into private session.

Tuesday 14 July 2009

Members present

Mr James Arbuthnot, in the Chair

Mr David Hamilton
Mr Dai Havard

Mr Brian Jenkins
Richard Younger-Ross

Witnesses: Air Vice-Marshal Carl Dixon OBE, Director Information Superiority, Ministry of Defence, Air Commodore N J Gordon MBE, Air Officer ISTAR Air Command, Ministry of Defence, and Brigadier Kevin Abraham, Head of Joint Capability, Ministry of Defence, gave evidence.

Resolved, That the Committee should sit in private. The witnesses gave oral evidence. Asterisks denote that part of the oral evidence which, for security reasons, has not been reported at the request of the Ministry of Defence and with the agreement of the Committee.

Q67 Chairman: We begin on these issues in private session with the question about what difference ASTOR would make to coalition operations in Afghanistan and you said you could give us some vignettes about that sort of thing. We would be grateful if you did.

Air Commodore Gordon: What does ASTOR bring to the party to start with? It brings to the party not only the Synthetic Aperture Radar that we can see the ground with but also the ability to detect moving targets, so it is very helpful in **. Where it has proved hugely beneficial as well is coming back to this cross-cueing piece, tying in the**.

Air Vice-Marshal Dixon: If I may, Chairman, can I elaborate a little bit on cross-cueing with a little bit of the red data as opposed to the black data we have been talking about so far. ** I wanted to tell the Committee a little bit about what we are doing about **. I can just imagine the weekend folks have had in their constituencies. ** One of the great benefits of some of the toys we have got in theatre now is that we are able to look, as the Air Commodore said, **, which is very important. If we take an example like ASTOR, ASTOR has got a ** range on its radar so it really is a strategic capability. It thunders up and down at ** and its radar can see **. If you think about a sortie **— and I should add by the way that it is not the only asset of its kind in theatre, the Americans have a number of JSTAR aircraft—which is a bigger aircraft again—in theatre. ** That is one example where that wide area surveillance being cued and tightened down, cross-cued into a detailed look is hugely useful in the **. Another one we are pursuing which is looking at using **.

Q68 Chairman: Before you get off that first one does ** rely on somebody sitting at a terminal spotting it, or is it a programme-driven alarm that goes off?

Air Vice-Marshal Dixon: There is software support to analysing the take. The ASTOR imagery comes down to a dedicated ground station and in effect you can video the product so it is a question then of how many heads you put around the problem. There are software tools, therefore, that are used in the analysis of that kind of product which we can

leverage, but I actually do not know technically whether there is a software tripwire which tells you, hang on, **.

Brigadier Abraham: Can I give you an example? It is not an ASTOR example but it is where ISTAR can automatically trigger, **, but it is one example where there is an automatic response to an event picked up by an ISTAR sensor.

Air Vice-Marshal Dixon: If I may I want to press on a little with **. There is one example where ISTAR R&D is being pulled through, in truth very rapidly, to give real effect to **. Cross-cueing we have talked about already in open forum. This wide area surveillance, quickly cross-cueing down to a tighter, more detailed surveillance is absolutely key **, but there is no panacea, it is all about increasing the quality of warnings and alerts rather than an absolute surety. For example, **, never a panacea. That is really the message I wanted to give you but with a little bit of operational flavour that does not sound like rubbish in an open forum. ** Do you want to say anything more?

Brigadier Abraham: As the Air-Marshal said, dealing with **. We have largely by UOR provided some considerably well-protected vehicles—**—for Afghanistan. **, all these big things. The other thing is to increase the investment in training the force, which we have done a great deal of, so that your people are better prepared, not just on an individual but on a collective training basis. This is big business for us in the MoD at the moment, as the Air Vice-Marshal says. ISTAR is not the sole path to deliver that but it is a very, very important enabling capability in support of that.

Q69 Mr Hamilton: Effectively what we are taking about is that it allows more choice in the sense that you are given more information and therefore the choices have then got to be made based on all of that information. The bit I was thinking about is as you gather all this information in, the human element then takes it up. The number of people you require as you gather more and more information must increase, and that requires another judgment which is the point you are touching on, and that is how the collaboration then begins to take place. Is

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it the case that as you gather more and more information you have to increase your staffing levels to try and deal with that?

Air Vice-Marshal Dixon: Inevitably as this ISTAR layering, value thing grows in awareness there is going to be a shift in our manpower thinking along the lines you say. There is a lot more to do technically yet and one of the problems is data retrieval and storage. If you just think about the electronic burden of holding on to full motion video—we have all got our CD collections if you have not moved on and started to stream online—

Q70 Chairman: Or iPods now.

Air Vice-Marshal Dixon: I cannot keep up with it now. I have two terabytes—

Q71 Mr Hamilton: I cannot keep up with the emails let alone anything else.

Air Vice-Marshal Dixon: All of that is based at home. You know, the old-fashioned 180 meg PC is manifestly unfit for purpose for any modern digital home, but there are various ways that you can cut the data storage and retrieval piece. It is a very good example: you can either keep collecting CDs, and that will not be possible for very much longer, or you can go and buy yourself a huge hard disk and strip all your CDs and still live with the stuff in your dining room, or you can get with it and stream the music offline—hopefully and obviously if you can afford the bill from Virgin. But there is a lesson in that for us and quite a lot of this data can be stored in the cloud and one of the benefits of our DII investment and the ** means that this data can be passed around a very, very large number of people collaboratively, and as I said earlier in the open session knowledge can always be improved. The more heads you can get around a problem the better usually the product is. A good example last year—you will recall the Kajaki Dam operation, much televised. There was **. It had to be a British operation but we sucked in a lot of American capability. If you could review **, so what does that tell us? You know, **, and if you had the Chief of Defence Intelligence here or the Chief of Joint Operations here, who has just recently been the Chief of Defence Intelligence, he would tell you that he would quite like to get in with his knife, fork and spoon amongst all of that take. Hitherto we have not really been able to do that because **. That is really what we are trying to do with our ** is actually get that cloud, that storage, access and information going properly.

Q72 Mr Havard: ** some of it you can automate but then it is only going to give you indicators and the analysis has to be done by human beings somewhere or other at different levels.

Air Vice-Marshal Dixon: It can be very much helped by technology for sure.

Q73 Mr Havard: Absolutely.

Air Vice-Marshal Dixon: ** all that sort of thing is very useful.

Mr Havard: Yes, quite, but the significance of the information at some point is going to be interpreted by somebody bright—20 per cent, 30 per cent, 40 per cent.

Chairman: It boils down to judgment at the end of the day.

Q74 Mr Havard: Absolutely, it is a judgment call at the end of the day but it is a more informed judgment call than previously.

Air Vice-Marshal Dixon: I would be surprised if after a Defence Review we did not conclude—to come back to the earlier question about manpower numbers—that we did not need to up our numbers over this whole area. I would be surprised.

Q75 Mr Havard: I would be surprised as well. The argument is not about whether you strap a gun on it—that is where the argument currently is with a lot of people and it is the wrong part of the argument. It is about your satellite capability, it is about your bandwidth, it is about your streaming of this stuff back to wherever you are going to put it, a data centre in Hertfordshire or wherever the hell you have it. It is about all those questions and that is the area it seems to me the investment needs to be put into rather than in a sense the front end capability of any particular platform, as to whether it can spit fire or not.

Air Vice-Marshal Dixon: There is as much an opportunity for ISTAR and C4 in the Defence Review as there is a threat, and I think a lot of the platform folks are probably looking at their fingernails a bit nervously about the Defence Review, but actually several people in the community that I work with, in the C4/ISTAR world, think this is a big opportunity because all the lessons learned point to the need to get this absolutely gripped. We have made the investments we have made and everything I said in open forum is right, we are going to take great benefit from DII, but this people layer that you both talked about is key.

Q76 Mr Havard: Can I ask you what discussion you have had? I have lost the plot a bit, I have to confess, I do not know where Lord Drayson sits in the architecture any more, but there is science behind all of this at the start and there is all of that stuff with business and all the other departments of government that need to chime in to let you do all these things.

Air Vice-Marshal Dixon: Yes.

Q77 Mr Havard: Where is the cross-governmental discussion of that going or is this all vested as just secret squirrel stuff within the MoD, because it cannot work if it is.

Air Vice-Marshal Dixon: It is not. I will start the answer because I know Kevin will have a view. I sit on a cross-government research and development committee with the ** and you can imagine the kind of agenda that is running there. The MoD is seen by those ** this huge leviathan, immensely rich organisation that seems to have a finger in every pie; I in all modesty look at them with, you know**—

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there is an interesting dialogue that goes on in there. But we have taken a view that we need to collaborate very much more closely around our R&D effort, largely on the principle that we are probably duplicating efforts, and I have made available out of my R&D colleagues in Defence a whole raft of information about what we are up to in our research and development programme to those other agencies. There is an example on R&D. On the communications side, you are probably aware in the Committee that there was an intention to deliver a pan-Whitehall TS (top secret) network called SCOPE. It was being run out of Cabinet Office and fell over technically. The phoenix that has arisen from that considerable pile of ash is called CliC¹ and CliC is going to be what was SCOPE. CliC is already working pretty well with **, and the MoD is third on the list alongside those two to come on board, and we are already paying our way into the CliC programme. We are not just networking DII as a sort of digital island for the MoD—a big digital island—we are also participating in connecting up government through those agencies, so there is a communications agenda running there. There is also a whole raft of work going on around **.

Mr Havard: No, but it is the technicality of collaboration that is important as well, stuff like bandwidth. We have just had *Digital Britain* which is all about mobile phones and all the rest of it, which obviously is a very small part of that bigger area, is it not? You need to reserve some of that.

¹ Note by witness: Collaboration in the Intelligence Community.

Q78 Chairman: Is there anything else that you need to tell us in private?

Air Vice-Marshal Dixon: Yes, there was one vignette I was going to offer which was to do with interoperability. One of the questions asked earlier was how interoperable are we because there is a sense in the line of questioning this morning that it is all a bit stovepiped. One of the things we are actually very good at interoperating with is **.

Brigadier Abraham: It is not just **. That is quite powerful.

Q79 Mr Havard: That six-bit stuff has come in through our Bowman system, has it?

Brigadier Abraham: No, ** is a discrete UOR to **.

Q80 Mr Havard: Can I ask you the other obvious question, where does it go in the future?

Air Vice-Marshal Dixon: I appreciate the Chairman has obviously got an eye to the clock now but the issue on Bowman is that Bowman currently in its fielded condition is a voice system. It is just about to acquire the very, very thin pipe data component on which there are a number of applications running, but the applications are not full motion video capable, the pipe is not wide enough. The things you send around Bowman Data are things like maps and charts and orders groups. It is not far off a fax capability, so do not imagine that Bowman Data is going to solve the world's ills, it will not, it is a very tight pipe.

Chairman: Thank you very much indeed, a very interesting session, extremely helpful and illuminating. Many thanks to all of you.

Tuesday 20 October 2009

Members present

Mr James Arbuthnot, in the Chair

Mr David S Borrow
Mr David Crausby
Linda Gilroy
Mr Dai Havard
Mr Adam Holloway

Mr Bernard Jenkin
Mr Brian Jenkins
Mrs Madeleine Moon
Richard Younger-Ross

Witnesses: **Mr Victor Chavez**, Deputy Chief Executive, Thales UK, **Mr Peter Eberle**, UK Business Development Director, Mission and Security Systems, General Dynamics, and **Mr Joel Grundy**, Head of Defence & Security, Intellect, gave evidence.

Q81 Chairman: Good morning. Welcome to our evidence session on the contribution of ISTAR to operations. There are two parts to this evidence session and the first is from industry, and you are most welcome. I wonder if you could introduce yourselves, please.

Mr Grundy: Thank you, Chairman. My name is Joel Grundy; I am Head of Defence and Security for Intellect, which is the UK trade association for the technology industry.

Mr Chavez: Victor Chavez, Deputy Chief Executive, Thales UK.

Mr Eberle: Peter Eberle, Business Development Director for UK business within General Dynamics UK Limited.

Q82 Chairman: Thank you all very much for coming to give evidence to us, some for the second time. This being an inquiry into ISTAR I think it would be only polite to everybody to say, tell us what ISTAR is?

Mr Chavez: I think it is very important that actually we look at that in simple terms. We have been working with Intellect and MoD to actually clarify the use of language around some of this technology; because it is an area, I am sure you would agree, which has a tendency to disappear into acronyms and so on. ISTAR in clear layman's terms would be the function by which we can collect intelligence, by which we analyse that intelligence and by which we share that intelligence with the potential users using communications mechanisms. Even though we talk about ISTAR—and the strict definition of the word is intelligence, surveillance, target acquisition and reconnaissance—inherent in that is actually very clearly a very strong need to communicate that information around the battle space. I think we all need to work very hard at actually clarifying this and communicating the benefits that accrue from having this very important capability.

Q83 Chairman: The last report we did on this was on unmanned aerial vehicles, UAVs, and I came to the conclusion while we were doing that inquiry that we were doing an inquiry into the wrong thing, namely, simply the platform; and actually the most important thing is to look at the entire system as a whole. I wonder if you could answer this question: do you think the Ministry of Defence pays enough attention to the direction and the processing and the

dissemination of these intelligence issues, rather than to the platforms themselves; or do they make the same mistake that I think we made?

Mr Grundy: Chairman, as you know from both our submission last year and the evidence we gave to that inquiry and this year, it is a longstanding concern of industry to make sure that there is balance across the sense, the understand, the share and the decide functions within the wider information security envelop. What I would say is, since that last inquiry last year, and as a result of some of the relationships we have had with the MoD this year and clarity around the programme and strategies, the MoD has very much recognised and put in place a number of things in the forward programme specifically to boost capability in the DPD environment. However, the caveat to that from industry's point of view is that whilst they are currently in the programme, in the future capability space, up until there is a point where they are commissioned, signed off and funded I think industry will retain some element of scepticism, if you like, until we actually reach the point of delivery for reasons you are very familiar with.

Q84 Chairman: We will be coming on to funding issues in a moment or two.

Mr Eberle: I think I would like to add a little bit more on the wider system and the use of the human in the whole process. ISTAR is not a stand-alone activity, it is something that actually supports every operation that is carried out; and of course there is a need for appropriate personnel and skills to ensure that the system runs well. That is a significant element of the capability.

Q85 Chairman: Is it possible to answer this question: what would be the best balance of resources between the collecting platforms and all the other aspects of ISTAR; or is that a meaningless question? You are allowed to say it is a meaningless question!

Mr Grundy: I think it is a very difficult question to answer without more context, Chairman.

Q86 Chairman: What a polite way of putting it!

Mr Grundy: The differences in terms of operational scenario or use case or the type of ISTAR that one would use in a maritime capability is going to have

a very different balance from that on current operations, say, because of density and all sorts of things.

Mr Chavez: I think current operations certainly make you re-evaluate the mix potentially. If you look at the current completes, the shift to asymmetric warfare has created a huge increase in the burden, the requirement and the challenge of ISTAR; because you have moved from an environment where in conventional warfare you are talking about identifying an enemy tank, or identifying an enemy platoon of soldiers; the ISTAR challenge of Afghanistan and Iraq is about identifying the terrorist, the terrorist in the crowd at the market, the terrorist with an AK47. These things are much more difficult to identify. Therefore, the ISTAR challenge and the capability that is required in Afghanistan and Iraq is significantly different, in my opinion, to that required for conventional warfare.

Mr Eberle: In a former life I was in the Royal Navy and I was a predecessor of Air Commodore Gordon in the Ministry of Defence and balance of investment studies were a fundamental element of what we were doing at the time to try and determine what the correct balance was. I can agree with Mr Chavez that it was difficult enough looking back at that stage when we were at just the end of the Cold War going into the new paradigm; and, I have to say, with current operations and this asymmetric threat, that is a very significant change which needs to be evaluated and is being evaluated by the MoD at the moment.

Q87 Mr Crausby: Mr Chavez, Thales in its memorandum says that “commercial sensitivity acts as a barrier to interoperability”, and we picked up here other issues in the United States. What are the main barriers to ISTAR interoperability?

Mr Chavez: I think this again is a growing problem that is brought about by the need for ever-increasing levels of integration between different ISTAR systems. In the past collectors operated in their own domain and there was not actually the communications and intelligence mechanisms to share that information in a sensible way; now that opportunity is open to us and MoD and most of the governments have moved forward by standardisation. With UAV systems there is a NATO-agreed standard for the imagery intelligence format that needs to be produced; and then you can share that between different nations. Ultimately, there is the prospect of integration. All of that intelligence comes down and is shared across, and that is what programmes like DABINETT are there for really, to take different information share it and make one and one equal three, for example. The issue around the commercial sensitivity is the fact that, because these things have operated previously in independent stovepipes, industry has been able to just define their own specifications for interfaces and so on. Really the commercial sensitivities are as much about the ownership of programme interfaces as anything else. Going forward, therefore, one of the key evolutions that MoD is in the process of making is moving to an overall system architecture;

and an overall system architecture in which it, MoD, owns the interfaces. It is really about extending that standardisation process down to the point that if Thales makes the system it has an MoD interface—an MoD-owned interface in terms of the intellectual property around that interface—so MoD can give that interface to any other company that it wishes to integrate its systems with. There is a transition towards an overall systems architecture and a much more open systems approach to definition of integration.

Q88 Mr Crausby: How effective has the MoD been in achieving interoperability across all of the ISTAR platforms? What more could they do? What more could industry do?

Mr Chavez: I think the MoD evidence on this is quite good in that we are getting to the point where we have compatibility; so UAVs produce information in the same format and that information exists within those systems. The next step is to actually put the cross-cutting projects in place that allow that information not just to exist in that individual stovepipe, but to be shared around the place. They are the set of projects that are now being delivered I think under urgent operational requirement and through the DABINETT programme. The importance of DABINETT, the centrality of DABINETT to actually making the most of all the information that has been gathered, cannot be understated.

Q89 Mr Crausby: Can you tell us generally, how important is the issue of data standardisation?

Mr Eberle: If I may, Mr Crausby, the UK plays a very major role in the standardisation in NATO, something that Air Commodore Gordon mentioned when he gave evidence; and part of that activity is trying to establish—and successfully in the past, although it sometimes take a little while—those key definitions which are going to be used for the exchange of data and for interoperability purposes. Clearly when the UK is operating a coalition of many, many nations, not all of which are in NATO, it is still NATO standards that build the bedrock on which everybody will interact. As I say, it does sometimes take time, but by and large the UK and the US work very closely together to make sure that evolving technological standards are actually introduced into the standardisation process as soon as possible so they actually lead into an evolutionary approach to interoperability.

Q90 Linda Gilroy: Apart from the discussion you just had with Mr Crausby about interoperability, to what extent is the equipment deployed capable of doing more than it currently does; is it held back by cumbersome procedures and lack of training or awareness; or is the greatest restriction in fact technological?

Mr Eberle: I think that many of the systems we talk about—whether in ISTAR or in a more general sense—have the ability to do multiple jobs: especially fast jets, fast fixed-wing aircraft, have the ability to do a number of missions, including a

20 October 2009 Mr Victor Chavez, Mr Peter Eberle and Mr Joel Grundy

certain element of reconnaissance which feeds into the ISTAR domain. Many of these systems have other capabilities which emerge when they are actually used that are not necessarily part of the requirement when they are designed; and subsequently the ability to use them to better effect and experimentation, which the MoD is taking ahead in a very meaningful way, is part of the way to actually make sure that you can find out these capabilities that you might not have necessarily foreseen, especially when you bring together multiple capabilities and achieve a better effect overall. Within industry, within GD for instance, innovation (and we have an innovation centre called the EDGE) is part of actually trying to make sure that those evolving capabilities actually end up in operational use.

Q91 Linda Gilroy: That sounds very much like the human interface is just as important as the technological interfaces you were talking about. Can you give us some sense of the balance in what may be a barrier to us getting the most out of what we currently have deployed?

Mr Eberle: As far as the first part of the question is concerned, human factors and human interface is absolutely vital, because if the human interface is overly complex then you have to make up for that in extended training and education; and therefore clearly it is in the best interests of everybody to make sure that interface is as reasonable as can be to minimise the training burden. In doing so there is an interaction required between the Ministry of Defence in its requirement setting and also industry, where we have quite a considerable capability across industry and human factors to make sure that we actually converse in a proactive way to make sure that we actually take that interface in the right direction.

Q92 Linda Gilroy: Mr Chavez, I do not know if you want to comment? Is that human interface as much about awareness of where the technology is going as anything else?

Mr Chavez: I think the technological dimension is still there and will develop. If we look at some of the most challenging threats in theatre at this point in time, IEDs for example, we do not have a 100 per cent reliable mechanism sensor system for detecting and identifying IEDs. It is very, very difficult in terms of the physics of the challenge and so on, and work is in train to look at—and Thales and various other companies are looking at—new sensor types and so on and new processing to help in that area. At some point there will be technological uplifts to platforms at our own theatres, I would hope. The human dimension—again, I come back to the point I made about the huge upsurge in ISTAR requirement—we are generating more ISTAR imagery than ever before. I think the UK is now the third largest user of UAV systems in the world. Our system, HERMES 450, has flown 25,000 hours; Reapers are probably about a fifth of that. There is a massive amount of data there. What we have seen is MoD managing a very significant upskilling in terms of

numbers of people and the skills that are required to actually do the imagery analysis on that. Industry has played a part in that: for example, on the Hermes 450 we fielded that as a service initially so that we could actually get it to theatre and have it flying in service in a very short time; so we actually had trained pilots provided by Thales. As we have gone on, 32 Regiment of the Royal Artillery have picked up that burden and so on; and the numbers of people going through and learning are continuing to grow on a regular basis, so that as we look towards WATCHKEEPER we will have additional capability there. The challenges of delivering these capabilities on a day-to-day basis are absolutely as much about having the skills and the humans trained to do the job as they are about the technology dimension, certainly.

Q93 Linda Gilroy: In the questions between Mr Crausby and myself have we identified where the focus needs to be in getting the most out of what we have deployed, or are there other things that we should be looking at?

Mr Chavez: I think in general terms MoD recognise the skills and the skills gap. There is a skills gap and I think MoD believe that it is a skills gap today and an anticipated skills gap in the future. I think recognition of that need is at the heart of making good progress. I think there has to be continued effort on the human and skills dimension before we can say that the job is 100 per cent done. The challenge is of course that these are not stable situations. As we move forward, we look to ever more increasing levels of ISTAR production: the recent additional tasking line for Hermes 450, for example, has been requested. There is a desire for increasing amounts of ISTAR, and with that comes a sliding scale of challenge as well.

Q94 Mrs Moon: I am always intrigued with technology about how fit for purpose it is by the time it is actually in the marketplace. You said that some of the equipment we now have has ability to have other capabilities that were emerging as it is actually in theatre. How much are we in danger of always going for new kit rather than actually developing and exploiting the potential of what we have got; and how much of what we have got is out-of-date the minute it arrives? I am interested in that boundary.

Mr Eberle: Let us take ASTOR for an example. It is a system that has been in development for some considerable time and is now out there in theatre and, by all accounts, seems to be operating extremely well. That was a system that was originally designed, of course, quite some considerable time ago for conducting operations against the mass armour of the Warsaw Pact, and actually it is showing today that it is very, very relevant for today's operations: however it has come about that way, that is indeed the case. Its ability to detect moving targets through its radar system, which is its main sensor, is absolutely vital because operations are taking place now in very extended areas, and where—certainly in Afghanistan—there is not the same amount of movement, for instance, as you would expect

normally within the UK. Therefore the ability—and this is this queuing thing again—to say, “Actually I see a vehicle moving along there that’s not what I’d normally expect this time of day; don’t normally see that over there, and actually there are two or three of them. Let’s get some more eyes on the case”; and because the sensor systems have their own strengths and weaknesses—with radar you can see something moving but you cannot necessarily identify it—so then you want to get a video sensor on there, a full motion video, so you can actually see what is going on and identify it and work out whether it is of interest or whether it is an appropriate target, for instance, for an operation. Actually those systems that have taken some time in gestation—the Sea King Mk 7, the mission system produced by Thales, which has many of the same attributes—are also contributing significantly, I understand. Actually serendipitous or not, the actual systems that have been introduced recently are providing meaningful capability.

Mr Grundy: If I may add two points, Chairman. One in terms of legacy and obsolescence and upgrades, again from an Intellect point of view we would very much come back to the earlier point about architectures; about the ability to incrementally uplift to bring in non-traditional ISTAR assets and so on and upgrade those capabilities within a common framework which, by and large, is intended to be cheap and easy and faster. The second point is certainly about the initial requirement-setting process, which is something industry, as I am sure you know, has been reasonably vexed about over a period of time. To report some positivity there specifically over the last year in this communications and intelligence arena, we have had a number of projects brought to industry at very early stages for consultation on an open basis about requirements, about concepts and about end use cases which, hopefully, has helped flush out some of these issues a little sooner.

Mr Chavez: I think we have all, as MoD and industry, got better at actually designing much more modular solutions than in the past. Things like Hermes 450 and WATCHKEEPER, the ability to plug and play with different payloads is very important; and the ability to bring on new sensor types as those sensors are developed without having to dramatically change the systems architecture, we are all getting much better at that. We can all draw lessons going forward from the introduction of some of those early capabilities, such as Hermes 450 into WATCHKEEPER. That modular design means that we can field a low risk off-the-shelf sensor today and then incrementally improve that performance at a later date without taking the capability out of service and so on. That modularity of design is really important. I think the other aspect is really around having the UK sovereignty over those technologies. Peter made reference to the Sea King Mk 7 which is a helicopter with a radar on board, and that system was designed to provide indigenous radar surveillance for an aircraft carrier; so not really designed for the purpose that it is being used in Afghanistan at all; and that has only been made

possible by the fact that Thales as the designer of that radar has the ability to change the radar parameters to actually suit the purpose of use in Afghanistan. That is a key sovereign capability in terms of having that intellect in the UK and having that intellectual property; that has allowed us to do that quickly without recourse to any other offshore company, without recourse to ITAR and those sorts of issues. Having the ability to modify and tweak and tune ISTAR assets is really important; because it is that tweaking and tuning that allows you to achieve interoperability; it is that tweaking and tuning that allows you to increase the probability of detecting specific threats that are threats to you today; so that is a very important point.

Q95 Mr Havard: I get to one of the sort of university questions here which is, and we saw this in America: technology deployed in theatre is more capable than is apparent from many current outputs. Discuss. In the discussion what it came down to was, how much of this is a problem in relation to the technology; and how much of it is about procedural awareness and training issues and the human exploitation of the information? We have started to do some of the human stuff, can I just go back to a couple of the techie questions about the technology. My understanding is the increasingly scarce and expensive commodity bandwidth is a problem behind a lot of technology exploitation; but there is also the question about standardisation, or lack of standardisation in relation to data, and data transfer and so on. The question about mandated standards from the MoD, and whether those mandated standards are the same for Europe, USA, whatever coalition environment and your problem about intellectual, all of this is wrapped in this general discussion. Is the barrier really technology, or are there some smart boys and girls at various universities who are going to solve that relatively quickly; or is it really about—and the place we should concentrate our fire is on the other part of it—the exploitation awareness training and so on; which is it?

Mr Eberle: Chairman, it sounds like a standard answer but it is very, very complex; and each of these elements clearly plays a role.

Q96 Mr Havard: I am a simple boy from the Valley so explain it simply!

Mr Eberle: The data standardisation is important, without any doubt whatsoever; because that actually is fundamental when you want to share data with other people. The position we find ourselves now in coalition operations requires us to plan to share data, and therefore puts an extra emphasis on the interoperability issue. When I spoke about NATO before, that currently—I think from an industry perspective certainly—provides the most cohesive standardisation activity on a multinational basis. As far as European interoperability is concerned, I do not think the MoD’s view on this has changed; because they would wish to use NATO standards wherever possible, rather than introduce some new European standard. The major focus for

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the UK and the US is to introduce standards for data, standards for data transfer, and standards for communications which are dealing with the emerging technologies that are coming out of the ISTAR domain. I think from that perspective, data standards are absolutely crucial. Going back to Victor's comments earlier, it is also absolutely crucial to have a blueprint to allow you to understand where the various systems are going to interface to each other; and therefore you need to standardise those interfaces so that you understand how you actually connect to it, and then those data standards will allow you to exchange information. You need something else, which is called a data model, which allows you to interpret the data, which is not self-evident; because even linguistic differences between ourselves and our US allies lead to misunderstandings if you are not careful; which takes us into the human dimension. There is very little point in trying to achieve technical interoperability if you do not actually have standard concepts of operation, and understand what your allies are going to do with the data that you provide them with, because that is all part of the trust and confidence that the Coalition enjoys. The final element of this is security. Many of the systems in the Cold War age were designed not to share information, and security that was put into the system and around the system was put there exactly to make sure that did not happen. Now, of course, security—national security—is still an issue; sensitivities—especially if you go into some areas of intelligence—are even greater; human intelligence, for instance. Therefore, you have to understand how you are going to put the security architecture in place which will allow you to exchange the data you want to exchange, and prevent the data you do not want to exchange from getting out of your own system. It is a mixture of all those things, and they have all got to be tuned to provide a package which actually provides operational capability.

Q97 Richard Younger-Ross: On standards, standards can be a barrier to quality; do we have a robust review process of those standards, or should we be concerned about that?

Mr Eberle: I think it is true to say that there is a review process but there are always tensions there. Industry is always interested in working out what it can actually supply, and therefore is interested in actually executing those and putting them into implementation. The MoD takes a policy-oriented view to this much of the time.

Q98 Mr Havard: Could I just have an answer to my question, because what I want to know is: do we spend more money on the technology; or have we got a lot of technology that we are not using well enough now and we should exploit it better first?

Mr Chavez: In answer to your question, the missing link in terms of exploitation is the DABINET-like capability, which is the need for an integration application to bring everything together. There is always an issue around bandwidth, but having ISTAR is highly addictive: the more you have the

more you want more, and there will always be challenges in that. Industry is doing a lot to make sure very smart algorithms are used to compress data, for example, to make the most of the bandwidth; but bandwidth is limited by the laws of physics.

Q99 Mr Borrow: I have listened with interest about the way in which we could improve interoperability and no mention has been made of the MoD initiative to establish a key systems adviser initiative. Have I missed something? I would be interested in industry's views as to whether that initiative has been effective; whether it has made a difference to development of the C4ISTAR, and just the Network Enabled Capability in general; and, if it has not, what does it need to do to become more effective?

Mr Grundy: From an across industry point of view I think the first thing to say obviously is that industry is very heavily involved in the KSA, bearing in mind that most of the people in it are industry secondees and were involved in the set-up of it. Industry as a whole is extremely supportive of the aims of the KSA programme as we understand it in terms of governance, coherence and interoperability. I think probably part of the reason we have not mentioned it as yet is that much of the work that the KSA does, as we understand it, is not directly industry facing; it is working within the MoD to aid them in going about their business rather than performing a discrete function which then interfaces with industry. Looking across the piece, one of the things that is quite encouraging for industry is that we have long said, and we said to the Committee last year, that the nature of the MoD's role as a customer across ISTAR, across communications intelligence, is changing because the boundary between industry as a supplier of big blocks of capability and the MoD as an overall architect is different than it has been historically. Because of that, industry has said a number of times, including to yourselves, that the skill set of that customer needs to change. The encouraging piece about the key systems adviser and some of the similar initiatives that are going on is that actually that represents an explicit or an implicit recognition for new skills to be brought in for a different type of function to be played by the MoD; which is a positive thing from industry's point of view, rather than continuing in the same vein that may not suit the changing pace of technology, and may not suit the greater need for integration and use of intelligence.

Q100 Mr Jenkins: I think Mr Chavez mentioned the word "DABINETT" which I have heard now and again but I do not really understand what it is. I know it is a wide-ranging programme. Is it likely to result in significant improvements in UK ISTAR capability, do you think?

Mr Chavez: DABINETT is effectively the creation of the software application that will allow intelligence that has been gathered from a whole range of different sources to be viewed, integrated and shared as a single whole. You will be able to look at imagery that has come off a Hermes 450 or a

WATCHKEEPER, imagery off an ASTOR, human intelligence that has been put into the system and various other things so that you can actually start to look at the same problem from lots of different perspectives. As we get into these really hard ISTAR problems—and, as I say, detecting the terrorist in the marketplace or the IED—there is a high likelihood that it is not going to be solved by one single sensor. You will actually have to pull together the threads of information from different sensors, at different times, to actually generate a picture to say there is probably something here that we are interested in.

Q101 Mr Jenkins: It sounds like a major programme. Who runs it? Who is in charge of it?

Mr Chavez: It is the responsibility of Air Vice-Marshal Carl Dixon who was giving you evidence the other day.

Q102 Mr Jenkins: How often do your companies meet—the people who are putting this programme together?

Mr Chavez: That programme is at the early stages of competition. No company has been appointed to deliver that capability at this point in time; so it is pre-competition.

Q103 Mr Jenkins: The input into the development of this wide-ranging programme which is so vital for us has no input from industry?

Mr Chavez: There have been pre-competition initial activities, but that was run by a company, yes, that took input from a variety of industrial players.

Q104 Mr Jenkins: Because when they are developing this sort of programme, the people who are on the programme surely they must be seeking advice from the industry as to what is possible to put in the programme before they actually carry on developing the concept?

Mr Chavez: Absolutely.

Mr Grundy: Absolutely, and this is something I would very much come back to again, not necessarily on the DABINETT programme *per se* but on a number of important programmes, including future core networks. For example, over the last year we have seen the MoD coming out to industry as a whole, as well as to discrete bilaterals with individual companies to get a sense of: what is the market's capacity to deliver the programme as currently constituted; what are the extra capabilities or technologies in the market that need to be integrated. It is by no means common across the entire estate but the fact that we have started to see that in certain areas, particularly in the networks area, we think is a big step forward for industry's ability to do some of the risk mitigation, to have a better understanding as a market earlier in the programme.

Q105 Mr Jenkins: Firstly, there are two elements to this programme: the first is the direct, process and disseminate element; and, secondly, the collection element focussed on “deep and persistent” surveillance. You mentioned Air Commodore

Gordon who said that the direct, process and disseminate element was currently still very much at a “concept phase” and “should be moving to initial operating capability in 2012”. As someone who comes from the motor trade, I remember concept cars; I never expected us ever to produce a concept car—and there might be one or two bits are dropped into production models—so why should I believe that a concept was ever going to meet production? Do you actually believe that in 2012 DABINETT will be up and running?

Mr Eberle: In fact, following on from what Victor was saying, there is actually a competition just about to be initiated or being initiated at the moment in the MoD acquisition approach. They will be going into an assessment phase. An assessment phase of the first part of DABINETT is due to start at the beginning of next year; and, as the Air Commodore said, as a result of that they hope to be in a position to contract industry to provide initial capability for 2012. That is a demanding timescale but they are moving along in accordance with their plans.

Q106 Mr Jenkins: That is not only a demanding timescale, history will show that we have never had a programme yet which allowed the complicated nature of the programme to develop and make money for its suppliers. If you want to put your reputation on it—that it will be delivered by 2012—good luck; but I do not think you are going to do it, do you, honestly?

Mr Eberle: What they have done in this particular case is to actually chop the requirement up into fairly small highly defined elements, and the one I just mentioned, which is called “improved ISTAR management”, that is actually going to deal with one specific element of DPD; so it is actually very much focussed on one element of it; not on trying to boil the ocean, as it were.

Q107 Mr Jenkins: You do not think the programme might be subject to budget constraints or cuts anywhere between now and 2012?

Mr Grundy: This is the great uncertainty which all of our members are facing as an industry for everything which is not on contract.

Q108 Mr Jenkins: Life is difficult, is it not!

Mr Grundy: Certainly with the prospect of a defence review coming up next year of whatever colour and type, we would certainly be looking for programmes like DABINETT to fare as well as possible out of that review, given the importance we think they have to the overall system. If the nervous system is not there big fists are.

Q109 Mr Jenkins: We can agree that in 2012 the concept phase may still be a concept phase rather than an actual production capacity.

Mr Eberle: They will certainly have finished the concept phase within about nine months of starting, so that should be well finished by then I think.

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Q110 Mr Jenkins: The other deep and persistent surveillance element—could I move on to project cost increases and budget cuts, Chairman? One of the things I have noticed now is that we have got these trimmings and cutting off around the periphery of some of the programmes and projects, like Soothsayer, which as you know is a ground-based system; and we have spent £84 million to date and we are going to abandon it because we are going to save some money. Not only have we got Soothsayer, how about Project Eagle or the Reaper? I have heard the Reaper programme might not be made permanent; and Project Eagle looks like it has gone. Our deep and persistent surveillance with our Nimrod programme falling behind, do you think we are going to be capable of producing this information to the DABINETT programme which is at this concept phase by now and capable of making the impact we want on the battlefield? Where do you think we are going to be in two or three years' time?

Mr Grundy: Obviously from our point of view that is partly a question for the MoD because we are not necessarily in charge of sorting out the programme and what should be in it. We have been lucky enough to have some sight of that programme going forward; and, again, industry is somewhat cheered by the recognition we have seen in that programme going forward of the need to plug some of these gaps. Our question as ever—to harp back to the previous point—is about, at the point where those programmes come to be delivered, will there be the necessary cross-departmental, cross-service commitment to them in the face of what is likely to be a fairly challenging funding requirement; and that is not something, unfortunately, that industry is able to drive.

Q111 Mr Jenkins: Let me get this right: the ISTAR programme that we could envisage, or did envisage at one time, is now no longer possible; what the programme will produce and deliver is it, like, 90 per cent or 80 per cent?

Mr Grundy: I am sorry, the ISTAR programme we envisaged is no longer possible.

Q112 Mr Jenkins: Yes, I think we can all agree we are going to cut back on our costs of information collection and processing; and I do not think your concept is going to be in place in time.

Mr Chavez: In terms of the overall programme, the industry and the sector really, as any industry would be, is concerned about the potential for future cuts to the sector—that is clear. Part of the reason why we are concerned, as much as anything, is because, with ISTAR communications etc., you do not have any platform to hang onto; it is not a tank; it is not a ship; it is not necessarily an aircraft. In the environment of a future strategic defence review there is no obvious

champion for C4ISTAR and yet we believe it is absolutely critical to getting the most out of your Armed Forces in the round, and so we face uncertainty. I think in terms of the deep and persistent collection, it is quite clear that technologically it is feasible. Reaper is a perfectly good platform if the MoD chose to go that way. The MoD has yet to really raise the requirement, find the funding and get endorsement of that. There is no doubt that a deep and persistent capability is technologically achievable, and there is a whole raft of different platforms that would meet that need.

Q113 Mr Jenkins: If I produce something that is 90 per cent capable it costs £100,000, but for every one per cent I need to improve the technology from then it doubles; so if I get to 100 per cent it is going to cost me £12 million. Do you not think your industry has done the £12 million job a few many times too often? Do you not think we really should be settling for the 90 per cent and having a much more robust system?

Mr Chavez: I think there is a strong push from industry to actually reuse existing capabilities. If you look at things like WATCHKEEPER, the UAV is not a brand new UAV design; it is an off-the-shelf UAV which is absolutely essential in terms of proving airframe airworthiness and so on; so it is really quite important at times to meet the timeline of bringing these things into service to use military off-the-shelf sub-systems and so on. The clever part about that is actually the integration. It is about the sensors; it is about the integration and so on. We have that exact same issue arising again. As we look forward, there is an array of technologies that can meet some of these longer-term requirements. The technologies and systems thinking are mature. It is really a case of affordability and scheduling in when these things are wanted in the programme.

Q114 Chairman: I have one final question for you, and it may be best directed at you, Mr Eberle. Would the ISTAR sector of defence capability be a particularly strong reason for suggesting to the Americans that the sooner they agree the UK/US Arms Trade Treaty the better it would be for the interoperability of the effort that Forces between our two countries make? You may answer yes to that!

Mr Eberle: Chairman, I will just be a little bit longer than that. Yes, it would make a contribution. I do not necessarily in my view think it is going to change the exchange of information for interoperability. What it will make easier is the time which it takes to get the agreements in place to transfer the technology itself. So it will definitely make that easier. I do not think it will affect the actual information itself.

Chairman: May I thank all three of you very much indeed for a most helpful start to our evidence session today, it is much appreciated.

Witnesses: **Brigadier Gordon Messenger DSO OBE**, Commander, 3rd Commando Brigade Royal Marines, **Air Commodore Stuart Atha DSO ADC**, UK Air Component Commander, and **Lieutenant Colonel Andrew McInerney**, Commanding Officer, Command Support Group, 3rd Commando Brigade Royal Marines, gave evidence.

Q115 Chairman: Welcome, and many thanks for coming to give evidence. Would you like to set out briefly who you are?

Brigadier Messenger: I am Brigadier Gordon Messenger. I am currently the Commander of 3rd Commando Brigade but, of more relevance to this inquiry, I was the Commander of Taskforce Helmand up until about six months ago.

Air Commodore Atha: Chairman, Air Commodore Stuart Atha. I am the Air Officer Commanding No 83 Expeditionary Air Group which means that I am the senior RAF officer in the Gulf region and in Afghanistan commanding the air component.¹

Lieutenant Colonel McInerney: Lieutenant Colonel Andrew McInerney. I am the Commanding Officer of United Kingdom Landing Force Command Support Group, but more relevant to this inquiry I was the Commander of the IX Group for Brigadier Gordon in Helmand on Operation Herrick 9.

Q116 Chairman: Thank you very much indeed for coming because you have obviously got direct and important experience and evidence that you will be able to give us. It appears that we are about to be moving the strategy in Afghanistan towards perhaps a more hearts and minds operation, more of a comprehensive approach. Now that we are beginning to do that though, do you think the technological tool of ISTAR is going to be as important, or become perhaps more important? If so, why?

Brigadier Messenger: The first thing, I think what we are seeing is a sort of continuum rather than a change in direction; but all the things you allude to are certainly heading that way. I think ISTAR will be as important but I think the key to this approach that you outline is a deeper cultural understanding, a deeper awareness of Afghan culture and the mindset that both the Taliban and the population in Helmand and southern Afghanistan have. I think technology will play a part in that, but can never provide the whole answer. The human interface, indigenous input into that is going to be key.

Q117 Mr Crausby: Can you tell us what the key challenges are that commanders face on the ground, particularly obviously in Afghanistan in getting the right information when they need it.

Brigadier Messenger: In terms of information there are often two competing priorities: the first is Force protection i.e. using our ISTAR in order to protect ourselves and the civilian population; and the second is developing our intelligence understanding; and the two may be doing the same thing at the same time but often they can be competing. The challenge I think is, firstly, to prioritise what exists in terms of ISTAR and ensure that it is targeted to the most important areas; and those important areas are changing all the time. It is the business of the

Commander to ensure that what will always be a limited asset is focussed on the right area and is providing that information as efficiently as possible.

Lieutenant Colonel McInerney: There is therefore a lot of process required to ensure that all of those assets are aligned to do that. As Brigadier Gordon said, that focus may require a focus on one thing at the detriment of another and there is a decision that has to be made there.

Brigadier Messenger: As a Commander, with information requirement or a decision that needs to be made, the first thing that I and the staff will do is identify what the critical information requirements are; and then (and in this case Andy was the Commander who led this) you either direct your own integral ISTAR assets, you bid for assets that exist across theatre to which you have access, or you seek access to strategic ISTAR assets that could assist you; and all those three things play a part. You then fuse the outputs of those and use that as a decision support, a command support tool. At every level that is essentially what ISTAR is. It is there to ease the decisions that are made both down at the section commander level all the way up to COMM ISAP level.

Q118 Mr Crausby: To what extent do you think that commanders on the ground understand the information that is available to them, or that could be available to them, and is training an issue? What are the priorities as far as training is concerned?

Brigadier Messenger: I think training is an issue, and there is a very clear difference between information and intelligence and you can be swamped by information, and one of the key things that the system has to get right is to collate that information and produce intelligence in the areas where it matters the most. I think there is also an education requirement for people on the ground to understand what is available, and that has not always been something we have been good at, understanding what can be made available to you. Therefore, asking for it or knowing how to task it is something which we are getting better at but it is a continuing education process.

Q119 Chairman: Mr Chavez, in the earlier session, said that it is highly addictive and that bandwidth is always an issue, in the sense that you would want more bandwidth. Inevitably, you would want more and more bandwidth, but how much of a problem is bandwidth?

Brigadier Messenger: My technical bar is set pretty low. I know that in terms of bandwidth there is little issue over a sensor that has been directed by, say, my headquarters down to the headquarters that has tasked that sensor. I think that direct A to B connectivity exists and bandwidth is rarely an issue. I think where the challenge is, and it has been alluded to in previous sessions, is ensuring that the information that is gathered by that sensor is not only available to me, it is available to subordinate

¹ Note by witness: The United Kingdom Air Component.

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units, it is available to flanking formations, it is available to anyone that needs it. That is quite a significant information management and dissemination challenge and bandwidth is one of the constraints associated with it.

Air Commodore Atha: Bandwidth is a challenge, and I know you have recognised that before, and it continues to be in theatre. There are a number of ways one can deal with the challenge. At the moment we push a lot of data around, and whether or not that is the best way of providing the information that is required is one area that we are looking at. There is also the way you look at the spectrum, and it is how you manage the frequency spectrum and co-ordinate better the use of that spectrum. These are two areas that in theatre we are working on developing and improving, hopefully.

Lieutenant Colonel McInerney: And not only transmitting the information, but making an assessment, making an analysis, and delivering not just the raw data to the commander or the decision-maker, whoever he may be, but delivering the analysed product from that. So that can require less bandwidth than actually transmitting the raw data, if the process is centralised and co-ordinated.

Q120 Mr Crausby: Finally, Chairman, to what extent is all of this technology making a real difference on the ground and to what extent is it just an investment in technology for the future? I do not expect you to go into detail on this, but I suppose the question is this. Is what we have got really saving lives as far as IEDs are concerned?

Brigadier Messenger: Technology is more than simply technology for technology's sake. There are capabilities in theatre which are making an enormous difference in terms of our broader understanding both of the Taliban and the cultural environment in which we are operating but also in terms of saving people's lives in reducing civilian casualties and the like, and there are capabilities out there which day-on-day are doing that.

Q121 Chairman: It may be that there are things you want to say in answer to that question which you would rather say in private. Possibly the best solution to that would be for you to write to us a confidential memorandum about the extent to which ISTAR helps to make a difference in terms of protection against IEDs. Was there something you wished to add to that, Air Commodore Atha?

Air Commodore Atha: I suppose it is the word "transformation" and quite what is the difference between an improvement and a transformation. I think, in some ways, there is transformation going on in theatre with the arrival of General McChrystal and his focus and direction. I do not think what he is saying is new, but he is bringing a new energy and a new drive to the campaign, and from where we are sitting, ISTAR sits at heart of this. This is about generating information that generates intelligence, which lies at the heart of the counter-insurgency operation. It drives the direction, the tempo and the timing of the kind of operations that we are involved

in, but quite whether or not that qualifies for transformation or just simply an evolutionary improvement, I am not sure.

Q122 Mr Jenkins: The Brigadier used a term which does not concern me so much as cause me to think how it works. You said "bid for", not "request", not "call down", but "bid for" these assets. Do you bid very often and not secure? What is the process?

Brigadier Messenger: Andy is the guy who did it over my time, but there are, at every level, priorities accorded because there are not enough assets available for the task to hand and, frankly, I think that is an inevitability. Therefore, at each level there will be a set of priorities and it is the responsibility of the subordinate commands who are bidding for that to ensure that their priorities are adequately represented at the higher level, and there are ways and means around that. What we used to do was actually rather than simply fill in a pro forma in advance or send a request up in advance, we would get to where we considered it important, we would get people to go to those headquarters, explain what we were trying to do to ensure that the priority that we felt should be accorded to any particular task or operation occurred and that we got pretty much what we wanted, and that was a very successful method of doing it.

Lieutenant Colonel McInerney: A system of organic or owned assets means that at each command level the organisation can allocate its own assets, but above that there are operational and strategic assets which do have to be bid for. This is economics of allocating scarce resources against competing aims, and the point is to make that prioritisation and for the command element to represent that. Then, also, I would actually send somebody physically with the requests up the chain so that were they misunderstood or was the point not made clear, we could actually affect that decision-making at each point.

Q123 Mr Jenkins: How many times was the bid unsuccessful? Do you have any idea?

Brigadier Messenger: For deliberate operations, quite often we would look to conduct an operation at a particular period but shape the timing of that operation as to the availability of ISTAR assets, so key were ISTAR assets to giving us the understanding we needed in order to commit that. So, yes, we were told, "You cannot have it at this time, but here is a slot when you can have it", and we amended our timings accordingly.

Q124 Chairman: The bidding is not for the information, the bidding is for the assets to collect the information?

Brigadier Messenger: It can be both. As I say, you have got the ability to direct, you have got the ability to bid for and seek a sufficient prioritisation to get assets which are not directly controlled by you and then you have access to information that is provided

or has been already collected by assets other than your own. I think those two things are not mutually exclusive.

Q125 Chairman: Why would there be a bidding process for information which already exists?

Brigadier Messenger: There is not; that is my point. The bidding is for assets, but for information it is simply a case of access to information. There is no bidding for information.

Q126 Mr Havard: Is there a bidding process for interpretation of the information, saying, "We would like an analysis of this information that is collected over this area over this period of time"?

Brigadier Messenger: No.

Q127 Chairman: Why is there not, because that is, surely, an asset which is in scarce supply like everything else?

Brigadier Messenger: In terms of the analysis of information?

Q128 Chairman: Yes?

Brigadier Messenger: Andy, I do not know if you can answer that, but we did not experience a blockage in terms of analysing information that we were gathering once we had targeted our priorities for that information analysis.

Q129 Chairman: Are we not constantly told that analysts are in very short supply?

Brigadier Messenger: Which is why one has to be very specific about what you are actually collecting against. Rather than just simply providing analysts with a swathe of information and asking them to produce something, just whatever, if you correctly outlined your information requirements, if you focused them in an area, then we did not find a shortage of analysts a constraining factor.

Q130 Mr Jenkins: Brigadier, to help us understand it, would it be possible (but probably the information is not there) for us to look at a period of time—maybe a week or a month or whatever—when all this bidding and all this allocation goes on so we get a much better idea of what is the on-going situation? Not problems, but how you deal with a situation.

Brigadier Messenger: Andy, do you want to give a vignette of how this occurred, which might shed some light on it?

Lieutenant Colonel McInerney: Yes. In order to focus our organic assets to know where to look, rather than just generally look, we did a series of what I call ISTAR trigger events, where we would pre-bid for and book all of the ISTAR across the electro-magnetic and human spectrum, and we tried to work out a period when that could all be stacked together. It would be a short period because it is a highly concentrated mass of activity—I am talking four or five hours of concentration—and it was important to have it all together, not to have any gaps across any of these capabilities. Then, when that was at a time and place of my choosing, I would drive in a ground

manoeuvre force, also a reconnaissance force, which would have effect, it would cause an effect to observe a reaction to that, and so, by observing a reaction over time and space and across the electro-magnetic and human spectrum, we could then see what actually the reaction was to that by the local people, by the Taliban, etc. We learnt a lot by doing that in its own right but, subsequently, we would also know where to look in more detail in the future.

Brigadier Messenger: Rather than saying, "We are interested in this area. Tell us everything that you know about this area", what you are able to say is, "We are interested in this area, this area and this area because we believe that this is what is happening in this area", and you can then target specific types of ISTAR capability against it. "In this area we want to know a little bit more about this", and, again, we can focus analysts into that area there. So that is how you get around it, by being focused.

Q131 Mr Havard: So you are having to form pattern types as well by that.

Brigadier Messenger: Yes.

Q132 Mr Jenkins: The idea is to ask for the supply and demand. You were trying to be helpful, but if there is more demand than supply, we want to know why there is not more supply to meet the demand, and I am not sure I can pick a level of saying, if we pick this level and see the requests at that level and how many we turned down or altered, we would have an idea of whether we are meeting the demand. Is it too difficult to put together?

Brigadier Messenger: I think the idea of bidding or requesting assets from a higher headquarters is absolutely what I have grown up with all my military career and it is something that is going to be with us. There are certain assets which are more efficiently used at a certain level because they have pan-theatre or pan-region, but each commander should own assets that they can directly task themselves. Getting that sort of balance is pretty normal business and not being the highest priority of your superior commander is, again, something that as a military person I am not unused to in whatever theatre, not only Afghanistan.

Chairman: Okay. I want to move on now. Bernard Jenkin.

Q133 Mr Jenkin: So far this morning we have had a very technical and useful conversation, but I wonder if I could take the conversation a little off-piste to the more general. What do you think ISTAR capabilities and UAVs mean for me? What do politicians need to understand about how this changes the nature of warfare and, indeed, changes the nature of what capabilities we require for standing military targets, so that politicians can get a handle on what priority we should give to those kind of programmes beyond just a tactical level?

Brigadier Messenger: I think ISTAR should be viewed, above all else, as a means of making commanders at every level better aware of the factors so that they can make better, more informed, safer,

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less collateral damage affected decisions, and that is the case whether that be in Afghanistan or in any theatre. It is very much about targeting the awareness of the commander as they make decisions. In Afghanistan we are used to having a certain level of capability, a certain level of awareness made available to us, and I think one of the challenges for defence is to take that level and extrapolate it from a theatre specific (Afghanistan) into our more general business, because I do not think we can walk backwards on the level of information and intelligence that we are currently giving our commanders.

Q134 Mr Jenkin: Most politicians, I have to confess, are very, very ignorant about these capabilities, but when a Secretary of State for Defence or a Prime Minister becomes aware of what is possible, do you think there is a danger of having unrealistic expectations about what these capabilities can achieve?

Brigadier Messenger: I hope not, but I accept that there is a risk there in that you will never have full awareness of all factors in making a decision. I never felt excluded by information that was available, although I did not know what I did not know, but nor did I ever know all the factors. One area where I think we are obviously developing and we are at a relatively low level now is this whole business of our understanding of the Afghan culture, the Afghan people, and our understanding of Taliban motivations, Taliban affiliations, the Taliban relationship with the population and the like, and that is something in which technology might play a part but it is about good old grinding human intelligence, it is about sensible use of the indigenous forces that are arrayed alongside us, and that is an area where I think we need to work harder.

Air Commodore Atha: Can I add a couple of things. You are asking what should a politician or a Secretary of State be aware of? I think there are two principal things I would perhaps say as an airman. The first one is there is no such thing as an absolute understanding of what is happening, what is going on. It is not a science, it is an art, it is judgment, and we cannot tell you definitively in all cases what is happening. The second thing is that ISTAR is, as we have said time and time again, a range of things, of which technology is but one part, and we accept and understand that some of the technologies are expensive. This is why we cannot satisfy all the priorities across the theatre, but the important thing is to take a theatre perspective about where success in a campaign is going to be delivered and, therefore, to have a coalition mindset about supporting priorities which may not be necessarily where you think. We talk about focusing ISTAR, which is important, but it is also important where we focus ISTAR and having a coalition mindset so that we take the benefit of the technologies and the capabilities that our other partners bring to the party and that when we are in the limelight and we have the

priority, then we take advantage of that. It is taking a theatre perspective for the greater good of the campaign.

Q135 Mr Jenkin: Finally on this track, do these technologies undermine the concept of delegated mission command? Do you feel that Whitehall is looking over your shoulder much more closely at what you are doing and, therefore, restricting your manoeuvre capability?

Brigadier Messenger: In terms of situation awareness at a strategic level, I would not necessarily say Whitehall is this, I think there is more involvement in higher headquarters as to what is going on on the ground because they have that capability. I think we have learned quite a lot. A few years ago, when this was relatively new technology, there was a sort of freshness about it which meant that perhaps people did do that. I think we are now quite used to having the level of situation awareness that we do and I think there is a greater understanding that a long screwdriver from higher headquarters or capitals is unhelpful and that there is a natural resistance to that now.

Q136 Mr Jenkin: But that risk exists.

Brigadier Messenger: The risk, I think, exists.

Lieutenant Colonel McInerney: If I could add, a tactical perspective on that is that there is a very human reaction to look at full motion video rather than look at all the rest of the capabilities because our human brain can interpret that, and so we do all tend to end up looking at the TV rather than trying to layer across the electro magnetic spectrum, and that does give a single perspective, and it is a human tendency which we are all prone to.

Q137 Mr Holloway: It is the first time, I think, we have ever had two DSOs giving evidence to the Committee. I know that you are very big on the sort of softer side, the local population and, of course, one day you may be able to smell IEDs from 500kms away, but if you can actually get the local people to tell you that someone has planted them or who is making the bombs, that saves lives and quite a lot of time and money. Do you think we are in danger of getting over reliant on the technical side because it is easier to watch TV? In this new evolutionary improvement, this continuum of what we have been doing in Southern Afghanistan, how do you think that side of the ISTAR picture will improve because so far I have had a lot of people say that they have been often acting on very, very imperfect information?

Lieutenant Colonel McInerney: In terms of developing human relations, I think it takes time and I think that there is a limit to what we as a Western society and international force will be able to do. Therefore, the key to this is to develop the capacity of indigenous intelligence and improve the fusion of essentially indigenous intelligence with our own, which means there are access issues that need to be overcome and the like. What I do not think we are in danger of, and the way I thought your question was

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going, is to turn to a sort of *Terminator 2* high-tech force. Our approach is very much about getting soldiers, both Afghan soldiers and international soldiers on the ground in order to provide the sort of reassurance and the security that people are after, and that has a benefit in its own right. The more that they are used to, the more comfortable they are in the presence of this, the more confident and reassured they are that we are there to stay and we are a permanent presence, then the more we will be able to use the greatest intelligence gathering potential of all, which is, as you say, the local population.

Q138 Mr Jenkin: Can I move back to the more technical brief that we have got. There was a programme called LISTENER that was cancelled a few years ago to facilitate cross-cueing of UAV information, which still has to be done manually. Does that mean anything to you on the ground? Did you miss that capability, or is it something we need to look at?

Brigadier Messenger: LISTENER is not something I am particularly aware of, but what I do know is that we had access to other UAV products than our own and we had the ability to task other UAV products than our own, but that is also true of other signals intelligence, other human intelligence and all other forms of intelligence. I would not say that coalition sharing is perfect, and there are some technological and protocol challenges still to be overcome, but it is not the sort of impenetrable barrier that it is often portrayed as.

Lieutenant Colonel McInerney: My organisation exists to exactly do that. There is one guy sat there on a desk with a whole array of collectors from all of our different assets and those which are loaned to us or allocated to us, and with a prioritised list of questions to answer he is seeking to play that orchestra. It might be information passed by word of mouth or by a yellow sticky but it does enable that by coming into one central hub across the human electro-magnetic spectrum, and the human dynamics of who is in which room and all that sort of stuff have to be overcome but it can be overcome.

Q139 Mr Jenkin: Finally, how important do you think it is politically in a coalition for the British to have our own owned and operated UAV capability rather than relying on other people's sensors, lookers and strikers?

Brigadier Messenger: Going to the various levels, in terms of the British brigade, or British-led brigade, I think it is important that we have our own array of assets, not least for the protection of ourselves, but also in terms of more direct tasking in things that we see as important. That is the sort of tactical level of ISTAR. In terms of how much we contribute to theatre out of ISTAR, we are a relatively small contributor when compared with the Americans and we get a lot more access than our assets might suggest. I think that an important part of us being a player on that stage is being able to contribute in a particular way at that level. I think that you will always have this sort of dilemma as to how much of

the theatre assets—it is the same actually with aircraft—do we need in order to be seen as good coalition members pitching in at a level at which a nation of our size and status should, and I think we reap quite a lot of benefit at the tactical level from being able to demonstrate that we do.

Q140 Mr Jenkin: So very important.

Brigadier Messenger: From my perspective, yes.

Air Commodore Atha: I think where the British troops are in Helmand, as we all know, is a crucially important area of the country. Therefore, it attracts a high priority with all the theatre resources that there are, and, as a consequence, we attract a far greater share of the coalition pie, as it were, than perhaps other areas of the country.

Q141 Mr Borrow: The Committee has received evidence in the past to suggest that a lot of the information being collected by ISTAR is information that had already been collected but that people did not know we had got or could not access. To what extent is that a problem and what is the MoD doing to tackle it?

Brigadier Messenger: Firstly, in any system which relies on overlaying but separable capabilities I think there will be a degree of duplication, but what we have to avoid is collecting the same thing in exactly the same way two weeks, three months and two years later, and that is very much about access to information that has already been collected, which is to do with intelligence databases and the like. Of course, having simply a national database is suboptimal. What we want is a coalition database. That is moving on. It is recognised, or has been recognised, as a shortcoming and it is something that is attracting investment, but I think we have got a little way to go.

Lieutenant Colonel McInerney: Certainly when looking to answer a question, we would first of all find out if we had the information, as best as we could, though data basing is a challenge. I would then look to find out do we have the information from which I could manufacture an answer—we have got it, collected it, but have not processed it yet—or do we have the data from which we can work it out before putting blokes in harm's way or scarce assets against the task. We'd try to go through that, first of all, in order to make sure that we were efficient in our use of assets and committal of ground manoeuvre. A lot of what we are doing as well is looking at a situation and then going back and looking at it subsequently to see if we notice any change as well and looking for those differences, whether that be looking for IEDs or looking for gatherings and changes in command structure or whatever. It is necessary sometimes to re-collect on the same target looking for differences.

Q142 Mr Borrow: Are you able to give any proportion of the amount of data that is collected that was already held, albeit not in a form that could be readily used? The work that is being done is to actually maximise the accessibility of the

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information that is available, it would be useful to have some feel for the scale of that. Is it five per cent of the information that you get that is in that category or are we talking about 50 per cent?

Brigadier Messenger: I think it would be very, very difficult to do because, of course, if we knew that it was information we had already gathered, then we would be using it. What I could not do is outline where it has been collected and we have it through any fault of process or organisation listed. So that would be difficult to do. ISTAR can be all things to all people. You could flood the skies with full motion video and the like, but it would not give you much other than an array of televisions to stare at. What we are after is targeting exactly what we want, and I go back to this point about supporting decisions to ensure that they are more effective decisions, safer decisions and more right decisions.

Q143 Linda Gilroy: Lieutenant Colonel, you spoke about human dynamics a moment ago. In the evidence that we had from Intellect they said to us that vital mission types like convoy, overwatch and base protection depend on a robust shared situational awareness capability that in turn is dependent on the ability to interrelate the different pieces of information quickly and accurately. They go on to say that whilst frontline personnel have proved stunningly adept at developing makeshift and workaround solutions to address the sort of missing information, the air gaps between different systems, especially in applications, the time and effort which has to be devoted to making sense of the grab and bag of different solutions could likely be better spent. Is that something you agree with and, if so, can you give us a flavour of the extent to which that is an issue?

Lieutenant Colonel McInerney: My daily business was pulling all that together—in fact it was my team's daily business—and improvising (and it has been referred to earlier) the capabilities which are not traditionally an ISTAR ISR capability being used in those ways, and there are lots of innovative ways. ISTAR in its introduction was used very innovatively compared with how it was originally intended, and the Committee is aware of that. If a mechanism existed to pull all that together, then that would be great. I think it is a human function. I do think the human brain is the function that does it.

Q144 Linda Gilroy: The limits between the human interface with all of the ISTAR information are always going to be there and no amount of technological development such as we have heard might be possible is going to replace that or even reduce it.

Lieutenant Colonel McInerney: It could reduce it. I do not think it could replace it. I think when we move from a white board to an electronic spreadsheet, then possibly it is more sharable because it can be in many different rooms and on many different desks at the same time; we could have collaborative ways of working and pulling this together. We could disaggregate some of the teams rather than having a

concentration of us all having to be in the same place at the same time. Some technological advances would be useful but I do think, at the end the day, it is a human brain function.

Q145 Linda Gilroy: The people who do that are a scarce resource at the moment. Is it something that would enable us to sustain the sort of operations you do on the basis of the quantity of people that you have got available? How should we be looking at the forward needs for skilled people and developing skilled people?

Lieutenant Colonel McInerney: I think the operational tempo at which the organisation is operating at the moment delivers that progressive experience at different levels as people progress through their career development and through the different jobs they will do. That experience of a military career, or a military/civilian interface career, delivers a lot of that. The preparatory activity and the mission specific training delivers a lot of that integration as well and, certainly at the taskforce or tactical level, the numbers of people that we could save by this sophisticated system would probably be five to ten, ones and twos possibly, and actually we would just be using them better and more efficiently.

Q146 Linda Gilroy: What about Harmony Guidelines?

Brigadier Messenger: I think there are specialists in this and I think you have touched on some short-view specialists in previous sessions, but I think this overall ISTAR is not a specialisation. Overall ISTAR is now everyone's business, it is commanders' business, and the fusing of the myriad of intelligence sources you can get is absolutely front and centre, what the Commander and his close staff do all the time. As Andy said, with the tempo of operations: the Royal Marines were on Herrick 5, we are on Herrick 9, we are going to be on Herrick 14, that is growing a core of expertise where ISTAR management and the role that ISTAR plays in contemporary operations is absolutely front and centre, and I think it is part of the bloodstream now when perhaps ten years ago it was not.

Q147 Linda Gilroy: In fact, more personnel are becoming aware of what it can do and are involved in helping to make it work?

Brigadier Messenger: Yes, absolutely, and our structures are adapting to reflect that.

Air Commodore Atha: If I may add, there is the specialist and there is the generalist and there are some specialisations I know that you have looked at, like linguists and analysts, in all sorts of way, but the human interaction in this comes in many parts of this chain, as it were, from the commander to the planner. One of the areas that we are really focusing on with ISTAR is this. You can always do more with more, but trying to do more with the same is what we are trying to do; so being clever in the way we bring different systems together, and that does not just mean technology; it is also about how you fuse in the human intelligence, another source where the

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human interaction comes through. Throughout the ISTAR chain there is a human interaction, not purely in the specialist area, although that is a crucially important area. There is a generalist interjection, if you like, throughout it.

Q148 Linda Gilroy: Air Commodore, you spoke a moment ago about the theatre perspective and the importance of being able to contribute. Apart from that, is there more that needs to be done to facilitate sharing between coalition partners?

Air Commodore Atha: Yes.

Q149 Linda Gilroy: If so?

Air Commodore Atha: There are three main elements of sharing. There is the technological, there is the procedural and then there is the security dimension to sharing, and each one of them has its own challenges, and there are some challenges that sit astride some of them. The technological is quite obvious, in the sense that we do have some systems that are very good at what they do but perhaps are not as good at speaking to other systems as they might be. There is the procedural element, which is part of policy, and part the human instinct that has been trained, and is securing the information that you have versus the balance of the benefit of sharing it. There is that sort of write-to-release mentality we are trying to promote in theatre rather than a sort of Pavlovian, "We will keep this to ourselves." Good intelligence, shared intelligence, is at the heart of that but there will always be the security side of it and we have to be careful here that we do not take too much risk to the security of the information, and each country will have a national position and that will be one of the challenges of a 42-nation coalition trying to find a middle way. What we are doing with our systems, and also the philosophy that has been applied in theatre, is very much one of sharing and writing to share.

Q150 Linda Gilroy: Could I ask a final brief question. I visited PJHQ during the summer and learnt how the lessons learned are fed back in. Is there a loop that learns about lessons learned on best use of the capability we have got there?

Brigadier Messenger: Yes, it is increasingly tried and tested. The proof of the pudding is that we came back six months ago, we wrote a report at the end and what we are seeing now are already some of the shortfalls that we identified being acted upon and improvements already underway, and I think that is an increasingly robust system. I am confident that the issues for me as the Commander in the field are understood by PJHQ and by main building and are being acted upon.

Lieutenant Colonel McInerney: That process goes on in theatre as well there is a tactical lessons identified cell staffed by PJHQ which delivers vignettes on a very tactical basis which we share across the theatre, so that a rapid lessons identified process is run as well as a more operational tempo one.

Q151 Chairman: Talking of PJHQ, the final question that I want to ask is who is in charge of all of this? PJHQ is in overall general charge of ISTAR assets, commanders on the ground have a certain tactical level of control as well, ISAF has a level of control and when Air Vice Marshall Dixon came in front of us he said that ISTAR governance is a hot topic. Do you think there are going to be any changes in who is in charge of all this? Is there going to be an ISTAR Tsar?

Brigadier Messenger: Yes. Who is in charge of it? I think having a focal point to conduct exactly the sort of functions that Andy has outlined is key to any headquarters. We have talked about how this is a much more central issue of any headquarters now than it has been. Having a single point in the headquarters where all these various feats come in, where the analysis is targeted through and that leads to product and decision support, I think, is an increasingly necessary part of headquarters at the formation level and above. What we are seeing in Helmand is exactly that sort of function being provided, and with the team that has arrived in ISAF with General McChrystal, again, at that sort of level they are trying to replicate this single focal point.

Q152 Chairman: Will there be a new Chief Information Officer actually in theatre under General McChrystal?

Brigadier Messenger: I do not know the answer to that, Chairman. I do know that the function of what I think a Chief Information Operations Officer should be doing is in the pipeline and will happen, but it really depends on how you define chief information operations. Some would say that it is linked to strategic communications and the like. I am not talking about that function, I am talking about the fusion of ISTAR and intelligence product.

Q153 Chairman: Might there be the risk of a bottleneck of information if you shove someone in there?

Brigadier Messenger: That is why it cannot be stovepiped, it has to be built into the headquarters and its importance in the overall headquarters has to be understood. Without being nice to Andy, which I would try never to be, he was an absolute key staff adviser to me, essentially the right-hand man, more so than perhaps other staff officers, perhaps your fires guy who might in the past have felt in that position.

Chairman: Okay.

Q154 Mr Jenkins: It is an interesting concept, but are you saying that we should collect jointly all intelligence information and it should not be dependent upon where it is being collected, either by the Army or the Air Force? Are you thinking that they will let you get away with just constantly merging activities so maybe we finish up with one Armed Forces rather than the three sides we have got today?

Brigadier Messenger: I think we need to be clear. I am talking about the capability. As far as I am concerned in terms of the capability, the product that

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was generated, I did not care where it came from and I did not care what organisation delivered it. I think that is not just true of ISTAR, that is true of everything that I commanded and experienced in theatre. That is a different thing than generating the equipment, maintaining the equipment, force generating the equipment and providing that capability to theatre. That is the domain of the single services at the moment, and I can see that that is a model which works.

Q155 Chairman: I have one final question. If you had been in our position, what would be the question that would be most difficult for you to answer?

Brigadier Messenger: It would not be a technical one. It would be; do I think that, through the application of technology or human factors, we are able to genuinely understand the cultural

environment that we are operating in, because if you had that context, that innate cultural understanding of the context you are operating in, then all these little things that you can see which are of tactical significance you would be able to put into context. That is an enormous challenge which is beyond technology and is a lot to do with the Afghan capacity. I would not say it was the hardest question, but I would say it is the hardest thing for us to do in this overall. Until we develop that, then we will not be able to fully maximise the information that is coming our way.

Q156 Chairman: We are doing the wrong inquiry again, are we?

Brigadier Messenger: I would not go there actually.

Chairman: Thank you very much indeed, again, to all three of you for a very interesting and extremely helpful and illuminating session.

Written evidence

Memorandum from Northrop Grumman

EXECUTIVE SUMMARY

1. This submission records the views and experience of Northrop Grumman on the contribution of ISTAR to current operations based on the company's extensive experience in the United States in developing and supporting ISTAR capability, particularly UAVs for the US Air Force, US Army and the US Navy. The observations relate specifically to the experience and lessons learned in employing the Global Hawk system from its first days as an Advanced Concept Technology Demonstrator (ACTD) in Operation Enduring Freedom to its current and projected employment in combat operations and support to civil operations.

2. ISTAR is a key military capability that generates and delivers specific information and intelligence to decision makers at all levels in support of the planning and conduct of military operations. UAVs play an important role in Network Centric Warfare/Network Enabled Capability concepts in both the US and Europe and are becoming a key element in the inventories of the world's militaries. Full exploitation of the operational benefits of UAVs is only possible in a joint integrated and network-enabled system.

3. UAVs offer vital persistent ISTAR capabilities for peacekeeping and peace enforcement missions and are transforming the battlefield in Iraq and Afghanistan. Future conflicts will see their role expanded dramatically. In war-fighting situations, they offer shortened target engagement timescales compared to conventional platforms. Within the US Armed Forces their use is already widespread, while, in the UK, the MoD has made ISTAR capability and UAVs a strategic priority.

4. Northrop Grumman has a 60-year history of providing more than 100,000 unmanned systems to military customers in the US and around the world. Its current portfolio spans a variety of different platforms: the high-altitude, long-endurance RQ-4 Global Hawk for the US Air Force and Navy; the MQ-8B Fire Scout helicopter for the US Navy and Army with the ability to take off and land autonomously on any aviation-capable warship and at prepared and unprepared landing zones; the MQ-5B Hunter medium-altitude UAV first fielded for the US Army in 1996 to provide dedicated reconnaissance, surveillance and target acquisition capability, relaying information real-time via video link to ground forces; and the stealthy X-47B Unmanned Combat Air System (UCAS) for the US Navy. The Navy UCAS will perform the first ever at-sea aircraft carrier launches and recoveries with a fixed-wing unmanned air system in addition to autonomous refuelling in midair demonstrating the capability of an autonomous, low-observable air vehicle.

5. The Global Hawk UAV developed for the US Air Force is a fully autonomous high altitude long endurance unmanned aerial system. It can autonomously, taxi, take off, fly, remain on station while capturing imagery, return and land. It provides persistent intelligence, surveillance and reconnaissance and is designed to fly up to 65,000 feet for more than 35 hours. Global Hawk is monitored during its flight by ground-based operators who can alter the system's flight path and sensor operations.

6. We have considerable ISTAR domain expertise that we wish to bring into the UK market and can contribute by providing systems integration and interoperability expertise.

BACKGROUND

7. Northrop Grumman is a global defence and security company and provides products, services and solutions in systems integration, defence electronics, information technology, advanced aircraft, shipbuilding, and space technology. With headquarters in Los Angeles, California, the company employs more than 120,000 people in 25 countries serving international military, government and commercial customers.

8. Northrop Grumman has a long standing relationship with and presence in the UK dating back more than 20-years. The UK remains a critically important market for the company as a supplier base and a source for technology partners. Northrop Grumman's annual spend in the defence and aerospace industry supports thousands of jobs around the UK generating intellectual property and facilitating exports. There are more than 700 Northrop Grumman employees in locations across the UK at Chester, Coventry, Fareham, London, New Malden, Peterborough, RAF Waddington and Solihull, providing avionics, communications, electronic warfare systems, marine navigation systems, C4I and mission planning, aircraft whole life support, robotics, IT systems and software development.

9. We are committed to bringing advanced technology into the UK defence market to accelerate the fielding of next-generation military capability and are able and willing to participate fully in helping to meet the UK's requirements in the ISTAR domain and to working with the MoD and the UK supply chain to achieve these objectives.

MEDIUM ALTITUDE EXTENDED RANGE CAPABILITY

10. The Northrop Grumman MQ-5B Hunter UAV has been the workhorse unmanned aerial system for the US Army since it was first fielded in 1996. It has more than 60,000 total flight hours and 36,000 combat flight hours. Deployments include Macedonia in support of KFOR from 1999 to 2002 and continuous deployment in Iraq from 2003 to the present. It has also been deployed with the US Department of Homeland Security in customs and border patrol operations.

11. The Hunter MQ-5B is a Brigade level reconnaissance, surveillance, target acquisition, and weapons platform. It has an endurance of 21 hours, airspeed of 80 knots cruise and 110 knots dash and an altitude of 18,000 to 20,000 feet. The Hunter can carry a payload weight of up to 430 pounds. The standard payload is an electro-optic/infra-red sensor.

12. It is currently the only operational UAV with a heavy fuel engine which provides logistics supportability with armoured units on the ground. Hunter can be operated by forward deployed operators from unimproved runways providing high military utility to mobile forces. The aircraft has highly redundant mission and propulsion systems, has an auto take-off and landing system, and has demonstrated operational availability of 99.3%.

13. The Hunter unmanned aerial system is operated and maintained on a 24 hour per day, seven days per week basis in Iraq by a contractor team under a Government owned-contractor operated (GOCO) arrangement in support of INSCOM and the Combat Aviation Brigade which deploys the aircraft.

HIGH ALTITUDE LONG ENDURANCE CAPABILITY

14. The Northrop Grumman RQ-4 Block 10 Global Hawk UAV is currently supporting the US Air Force. To date three Global Hawks are deployed in support of US military operations, logging more than 26,000 combat hours conducting intelligence, surveillance and reconnaissance missions and with more than 37,000 total programme flight hours and 95% mission effectiveness. These UAVs are operated overseas by USAF pilots from a mission control element stationed at Beale Air Force Base in Northern California. The UAV is equipped with electro-optic, infra-red and synthetic aperture radar sensors to provide high-quality real-time imagery.

15. Global Hawk has been used in border patrol missions in Iraq since 2003. Missions are typically of 24-hour duration. Imagery is collected using electro-optic, infra-red and synthetic aperture radar sensors. The long endurance allows multiple passes over the same target. Early in a mission the operator may use synthetic aperture radar. In good weather conditions this may be switched to using electro-optic/infra-red cameras on the same target. The infra-red capability can be used at night to monitor changes in activities. Global Hawk can also be used before and after IED missions allowing pre-detonation and ground patrol route planning. Images collected are transmitted via satellite to imagery analysts at the Distributed Common Ground Station. The high resolution data is exploited within 20 minutes and the raw imagery is posted on a secure military website within minutes for use by anyone with access around the world.

16. The Global Hawk has autonomous high-altitude, long-endurance (HALE) flight characteristics. The air vehicle flies at altitudes up to 65,000 feet for up to 35 hours at speeds of over 300 knots. For example its coverage is such that it can image an area almost seven times the size of Wales or some 60% of the UK's entire land mass in just one mission. During its trials with the US Air Force's 31st Test and Evaluation Squadron and during its first deployment in Operation Enduring Freedom, the Global Hawk system was shown to be flexible and dynamically re-taskable.

17. Two Block 10 Global Hawks are also currently being used in the US Navy's Global Hawk Maritime Demonstration (GHMD) programme. Stationed at Naval Air Station Patuxent River, Maryland, the air systems are being used to help define the concept of operations for maritime surveillance.

18. The US Air Force's desire to expand Global Hawk's role supporting the service's intelligence, surveillance and reconnaissance (ISR) mission launched the development of a more capable and powerful unmanned surveillance system, the next-generation Block 20 Global Hawk. Its first flight was in March 2007.

19. The larger more capable Block 20 aircraft will carry up to 3,000 pounds of internal payload and will operate with two-and-a-half times the power of its predecessor. Its open system architecture, a so-called "plug-and-play" environment, will accommodate new sensors and communication systems as they are developed to help military customers quickly evaluate and adopt new technologies.

20. The US Navy has recently selected a marinised version of the RQ-4 Global Hawk unmanned air vehicle as the platform for the Broad Area Maritime Surveillance Unmanned Aircraft System (BAMS UAS) programme. This will provide the US Navy with a persistent maritime ISR system to protect the fleet and provide a capability to detect, track, classify, and identify maritime and littoral targets.

21. Global Hawk is the only unmanned aerial system (UAS) to meet the military and the Federal Administration Aviation's airworthiness standards and have approval to fly regular flights within US airspace. The system is continuing its operational support having logged more than 10,000 combat flight hours with 95% mission effectiveness.

CURRENT OPERATIONS

22. Contribution of existing systems in Afghanistan to ISTAR capability

The Global Hawk system has been employed in the Gulf since late November 2001. The decision to employ the “experimental” Global Hawk system approximately three years ahead of any plans for routine system employment was based on the need to provide to the greatest degree, “persistent surveillance” across the Afghanistan landscape. The need to support near continuous multi-sensor coverage of Afghanistan from distant bases in the Gulf region required the introduction of systems with extended endurance.

Since its first employment, more than 26,000 combat hours have been flown. This is over 70% of the programme’s total flight hours. Today, the Global Hawk Block 10 system, a production version of the original ACTD (prototype system), flies near continuous operations from a base in the Gulf. The system carries electro-optical, infra-red and radar imagery sensors simultaneously.

23. ISTAR and the security of deployed troops

The Global Hawk system, originally considered a strategic platform, is employed both strategically as a routine collection system and tactically as a quick response system. Each sortie is launched with a standard imagery collection deck. During operations, the system’s crewmembers respond to Time Sensitive Targeting (TST) requests. Often these TST request are a result of “troops in contact” or in response to critical combat operations such as IED incidents. Imagery is tasked and collected in near-real-time and disseminated in minutes.

Global Hawk is uniquely capable of responding rapidly to TST targeting because of its combination of enabling capabilities. Flying at altitudes of up to 60,000 feet provides a sensor horizon beyond 150 miles (the visible horizon is 300 miles) with a slant-range grazing angle that is less hindered by Afghan mountain ranges and travelling at airspeeds equivalent to 320 knots ground speed enables re-visit rate flexibility. The long endurance capability supports a battlefield persistence that allows for tasking, re-tasking and post event tracking for IED situations. The multi-camera (electro-optical, infra-red, and synthetic aperture radar cameras) provide multi-spectral images of target sites used to diagnose potential IED situations as well as forensic analysis of post IED events. The multi-sensor imagery payload also provides imagery on demand regardless of weather conditions.

24. Accuracy of coalition targeting and reduction in civilian casualties

The Global Hawk system provides near continuous coverage of routine and TST areas. The imagery is collected and posted at secure coalition web sites and sent directly to tasking authorities or combat teams where appropriate. The combination of visible electro-optical, infra-red and synthetic aperture radar imagery allows collection and exploitation to be very precise and informative. Typically, the electro-optical camera provides a high resolution black and white image as seen by the naked eye. The image quality is sufficient to determine what class of vehicle is imaged such as a civilian bus, type of tank or type of armoured personnel carrier. The infra-red image supplies information about the status of the target. It has sufficient resolution to determine if a target is occupied, active, or abandoned. It can resolve in daylight or at night the number and location of individuals in relation to the target area. The synthetic aperture radar camera provides very accurate target location information as well as Ground Moving Target (GMTI) information. It also serves as an accurate imaging system regardless of weather conditions such as clouds, dust storms, or severe weather. Combined, these sensor systems provide accurate timely imagery collection against single or multiple target areas supporting coalition targeting. In addition, the broad area covered by these camera systems at 60,000 feet provides for rapid surveying of large areas. The cameras on board for example, can image more than 40,000 square miles on a single mission.

25. Support personnel and training

The Global Hawk aircraft are based in the Gulf. On site, less than 50 people are deployed to provide launch and recovery operations and maintenance support. The actual mission portion of the operation is conducted remotely from Beale Air Force Base, California. This arrangement minimises the number of deployed personnel required. With the majority of mission staff remaining at “home station” in the US, continuation training and upgrade training typical of flight crews to new mission capabilities is more easily accomplished. In fact, new crew members are often trained on actual combat sorties guided by instructors. This allows for realistic training in situations that typically can not be synthesised or simulated in a training environment.

Training on Global Hawk is simplified by the nature of the system’s design. Global Hawk is considered an autonomous UAV system. This means that the pilot is in control of the aircraft but the onboard computers are actually flying the system. Takeoff and landing are both automated and require no manual flight inputs, and are accomplished by issuing a single command to the air vehicle via a computer mouse or keyboard stroke. The mission can be flown in a completely pre-programmed mission route and collection

or the mission can be modified in flight by the pilot and sensor operator based on dynamic re-tasking or changes in priorities or situations. The system, therefore, flies hands-off if desired and is always ready to accept operator override commands. Since landings and takeoffs are accomplished by the computer, weather conditions such as low ceilings or limited visibility normally restricting manned systems are not an issue with Global Hawk.

The autonomous aspect of Global Hawk has an additional benefit. Since the pilot and sensor operator are not literally flying the aircraft, the aircrew can focus their attention on mission execution.

26. Benefits of Network Enabled Capability in permitting a greater variety of sensors and weapons to be available on demand to commanders and troops on the ground

Specific to current Global Hawk employment, the use of classified chat rooms where mission tasking is dynamically changed provides for very effective mission employment. With the tasking authority, intelligence exploitation elements, commanders and in some cases ground troops or other coalition aircraft connected via live chat, this enables the Global Hawk aircrew to respond rapidly to the dynamics of the battle space. It also allows other ISR system tasking and exploitation to be cross-cued in near real time.

27. Gaps in current ISTAR capabilities

For Global Hawk, the greatest gap in capability is the current lack of signals intelligence (SIGINT) payload. The Block 10 system employed today does not carry a SIGINT sensor. The Block 30 Global Hawk, set to deploy as early as one year from now, will carry a full complement of SIGINT (electronic signals collector-ELINT, and communications signals collector-COMINT). This fully developed capability will provide a true multi-INT capability. The Block 30 with SIGINT is the baseline and heart of the USAF force structure. The combination of imagery and signals collection provides opportunities for real time internal and external cross-cueing. The production plan for Global Hawk Block 30 with the full SIGINT system is not scheduled to be built and employed until 2012 based on current acquisition schedules.

28. Achieving the full benefits of ISTAR

The full benefit of Global Hawk will be realised when the SIGINT sensor is added to the Block 30 system. In addition, the introduction of the Block 40 multi-platform radar technology insertion programme (MP-RTIP) sensor, will add a new dimension to the GMTI and synthetic aperture radar imagery collection. This system is in the final stages of development testing and will be available for employment in the later part of 2011.

29. Interoperability of existing ISTAR systems and capabilities with Coalition forces

The Global Hawk system's imagery collection is exploited at a common exploitation ground station and the interoperable nature of the system is as effective as those connected to the exploitation site or the classified web sites where imagery is posted. Most of the Global Hawk products are posted at classified web sites providing easy access to the exploited imagery. Tasking or re-tasking of the system is accomplished via the classified chat rooms which connect taskers, exploiters and commanders with the Global Hawk aircrew.

The Global Hawk also carries a line-of-site data link which conforms to the US standard Common Data Link (CDL) architecture. Imagery data formats also conform to the US standard. Radio communications systems on board the aircraft are also common with Coalition forces. The pilot has the ability to communicate directly with other forces via UHF or VHF through the Global Hawk platform with voice communications.

CONCLUSION

30. Northrop Grumman has a 60-year history of providing more than 100,000 unmanned systems to military customers in the US and around the world, from the high-altitude, long-endurance fully autonomous Global Hawk for the US Air Force and Navy to the Fire Scout helicopter for the US Navy and Army, to the Hunter medium-altitude UAV for the US Army and the stealthy X-47B Unmanned Combat Air System (UCAS) for the US Navy capable of at-sea aircraft carrier launches and recoveries.

31. Global Hawk was originally developed as a fully autonomous strategic collection platform. It was envisioned that the crewmembers would simply launch and recover the system while maintaining watch over the pre-programmed mission execution. By rushing the ACTD (prototype system) into combat and taking advantage of the flexibility the system offers, concepts of employment were changed literally "on the fly" to make the system's employment more effective. With more than 26,000 combat hours, the Global Hawk has proven that a strategic system can be tactically employed.

32. We learned that the computer on board was not a substitute for the pilot, but rather, the computer eased the burden of a dynamically changing battlefield allowing the crewmembers to concentrate on rapid re-tasking, optimising collection for the current task while planning for the next collection event.

33. We have learned that the combination of altitude, speed and endurance coupled with a full complement of advanced sensors in an open system architecture provides the best capability to survey a battle space as rugged, vast and remote as Afghanistan. Many of the lessons learned have been key to modifications to the Block 30 and Block 40 systems.

19 June 2009

Memorandum from Intellect

INTRODUCTION

1. Intellect is the UK trade association for the IT, telecoms and electronics industries. Its members account for over 80% of these markets and include blue-chip multinationals as well as early stage technology companies. These industries together generate around 10% of UK GDP and 15% of UK trade. Intellect is a vital source of knowledge and expertise on all aspects of the hi-tech industry. Intellect works with the Ministry of Defence on a range of policy and market areas in the C4ISTAR sector, providing a channel for industry inputs and engagements.

2. The following paper provides the views of Intellect member companies on the UK's Intelligence, Surveillance, Target Acquisition and Response (ISTAR) capability and underpinning issues around its support to current operations. A high proportion of Intellect's members are active in Defence, and this submission draws on their views. This paper addresses those aspects specified in the Committee's call for evidence, and also raises issues that Intellect believes it is important to address in this inquiry.

3. Intellect welcomes the opportunity to provide input to the committee and is keen to engage with the committee, the Ministry of Defence, and UK Armed Forces to ensure progress on the issues raised in this submission.

INTELLECT'S POSITION

4. The UK's ISTAR capability—in its modern, network-enabled, joint form—has come of age during operations in Iraq and Afghanistan, and has had to rapidly mature in a demanding environment with little room for error. Whilst there will inevitably be growing pains—and demand for intelligence will always outstrip available resource—Intellect believes that the progress made in this area over recent years by the Ministry of Defence and industry is in many ways commendable given the severe operational and resource pressures in play.

5. The Committee's 2008 report into the UAS element of ISTAR echoed many of Intellect's views on the need to prioritise ISTAR direction, processing and dissemination (DPD) functions, so that UK Defence can obtain maximum value from its base of collection assets. In the meantime, the worsening economic and fiscal situation has only strengthened the need to get "more for less" across Government, and key to doing so in Defence is the effective and efficient use of information and communications capability.

6. As Defence's eyes and ears, ISTAR is a critical part of this capability, enabling the optimal tasking, informing and coordinating of assets and personnel. After a period of rapid capability expansion, industry believes the focus now needs to be on ensuring greater ISTAR cohesion and interoperability moving forward. Operational needs have driven the "bottom up" acquisition of individual ISTAR capabilities—including through extensive use of the UOR process—but to ensure these are able to deliver enterprise benefits they will need to work together, and to be directed and exploited from an enterprise level.

7. In interactions with Intellect, senior MoD personnel have proven to be alert to this need, and have established processes and initiatives which seek to address it. Some of these are still, however, in their infancy and all are subject to the same severe resource pressures currently being felt across Defence. Whether or not these initiatives are sufficient is therefore yet to be seen, but if they are to make progress in unlocking further benefit from this critical area, this agenda will need to be fully supported—organisationally, politically and financially.

LESSONS FROM CURRENT OPERATIONS

8. Current operations are increasingly making use of so called "non-traditional" ISTAR—information gathered for one specific purpose (from, for example, airborne targeting pods) which can generate benefit for other objectives if integrated into ISTAR programmes. This includes a wide range of Human Intelligence (HUMINT) material and platform mounted collectors which generate a significant amount of relevant data whilst performing their primary role. ISTAR capability needs to be able to exploit this data on the same basis as that gathered through "traditional" ISTAR assets, rather than retain a split between the two based on their collector.

9. It is also clear that vital mission types like convoy overwatch and base protection depend on a robust shared situational awareness capability, which is itself dependent on the ability to interrelate different pieces of information quickly and accurately. Whilst frontline personnel have proved stunningly adept at developing makeshift and workaround solutions to address “air gaps” between different systems and—especially—applications, the time and effort which has to be devoted to making sense of a grab bag of different solutions could likely be better spent.

10. Funding constraints for DPD have been a significant factor and, whilst parts of MoD are alive to this shortfall, UK Defence as a whole must rid itself of the dangerous misconception that purchasing a collection asset is the same as acquiring a new ISTAR capability. What resource is available must be balanced across all stages of the intelligence cycle to ensure maximum benefit, rather than concentrated on buying the maximum number of platform assets. The emergence of new procurement models including incremental acquisition, contracting for availability and through life capability management will hopefully incentivise a more rounded view.

INTEROPERABILITY AND COHESION

11. Intellect’s members believe that the major challenge now facing UK Defence is how to exploit the information gathered by ISTAR in a coherent manner, rather than how to advance point technologies. Whilst extant and emerging niche needs will continue to need to be addressed by new products and solutions, it is widely held in industry that the greatest leap forward in overall capability and operational support will come from effective integration and use of the information gathered. This will require a greater focus on the DPD stages of the intelligence cycle than has previously been evident.

12. As highlighted in the committee’s last report, there is a lack of DPD programmes in service which cut across equipment silos, though upcoming projects including WATCHKEEPER are geared further towards information exploitation than current systems. Industry is aware of a number of UOR procurements designed to remedy this gap (including ATTACKER, I3M and IPA), but is anxious that insufficient data storage and processing, imagery analysts and specialist information technologists will prevent them being able to operate fully.

13. MoD is clearly aware of the need to improve interoperability between programmes, and much discussion has taken place with industry about how an Enterprise Architecture can be put in place to enable integration across silos. Industry is keen to see such an architecture and common interoperability standards adopted, and for MoD to develop appropriate systems engineering expertise and commercial models which support its use. The Key Systems Advisor initiative is potentially a key cog in developing a more cohesive approach, but has yet to feed through into significant programme alterations—thus MoD has not yet had to confront the inevitable clash between this drive to increase interoperability and individual services’ enthusiasm to acquire a given asset.

AN ENTERPRISE VIEW OF ISTAR

14. Intellect’s members believe that more cohesive management of ISTAR at an enterprise level is required, whether in capability development or in theatre. This challenge is understood by some senior MoD personnel, and whether for commanders in theatre or capability managers in London, MoD is increasingly seeking to understand and exploit ISTAR as an end-to-end (and, just as critically, side-to-side) joint information flow, rather than a collection of stovepipe projects.

15. One significant development since the committee’s last report has been the creation of Capability Management Strategies, under the auspices of TLMCM. These seek to plot a forward course across areas of capability (including ISTAR) and demonstrate how MoD intends to move from the current programme state to a future state based on clear objectives and timelines. The CMS’ place each project’s development in the context of its fellows, the operational environment and MoD’s wider aims, and should help inform the decision making of capability management groups. Whilst the strategies themselves are at an early stage of maturity, the advent of their creation is commendable, as is MoD’s willingness to consult on their content.

16. Some in industry are keen that a similar cohesion in ISTAR delivery be developed. The evident need to direct and exploit ISTAR at enterprise as well as operational and tactical level, and the interdependencies between its different components, illustrate a gap in unified ISTAR command and control, for example. Opinion is split on the potential virtue of making ISTAR distinct from other military capabilities, through a single tasking and management structure in theatre, but it is clear that ISTAR’s legacy of silos cannot endure.

Memorandum from AgustaWestland

EXECUTIVE SUMMARY

- Helicopters play an important role in the overall Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) mix of systems in the Afghanistan theatre of operations.
- Battlefield helicopters form an integral part of the ground manoeuvre commander's assets in Afghanistan and the gathering of intelligence at the tactical level.
- Helicopters provide a man-in-the-loop capability that enhances both tactical surveillance and target acquisition and timely decision-making, particularly where there are restrictive Rules of Engagement.
- AgustaWestland has a range of products with powerful ISTAR capabilities that are either already deployed, or could in the future be deployed in operations in Afghanistan.

AGUSTAWESTLAND

1. AgustaWestland (AW), a Finmeccanica company, employs approximately 4,050 personnel in the UK. AW is a world leader in the helicopter market. AW has the technology required to undertake the design and development of helicopters and tiltrotors for civil and military use. AW's capabilities range from the preliminary analysis and definition of operational requirements to the design, development and production of transmissions, rotors, metal and composite structures and avionics systems, as well as their integration into a complete "helicopter system". This includes the design and manufacture of helicopters whose principle role is ISTAR for both military and police operations. The company also specialises in the provision of helicopter maintenance support and training services.

2. Historically, helicopters have played an important role in ISTAR. AW helicopters and the systems they carry have become more sophisticated, this combined capability has enhanced the ISTAR products available to commanders, both in land and maritime operations.

HELICOPTER ISTAR OPERATIONS

3. *Intelligence and Reconnaissance*

The gathering of intelligence is a multi-faceted activity utilising a wide range of systems as well as people. Military helicopter crews, given the speed and range they cover on the battlefield, are in a unique position to seek out and gather low level intelligence on every mission they fly. This is particularly the case in counter-insurgency and internal security operations where subtle changes to the patterns of normal life can be noticed and reported by crews during routine operations. Battlefield and maritime reconnaissance helicopters are able to search and find enemy forces, as well as deploy specialist reconnaissance teams for the purpose of intelligence gathering. Working with ground forces, they conduct a similar tactical role as ground based reconnaissance vehicles—but they are able to cover larger frontages and tactical areas of responsibility.

4. *Surveillance and Target Acquisition*

Helicopters are used extensively in the surveillance role by military and civilian agencies employing sophisticated equipment—among them infrared and colour camera systems. These enable helicopters to play a vital task in both the acquisition and tracking of targets and in conjunction with ground based response teams, to engage individuals or groups. The presence of aircrew is a vital factor as he/she is operating as part of the overall team with eyes on the target and the ability to play a full and immediate role in the decision and action making processes required in the operation. In contrast Unmanned Aerial Vehicles (UAVs) have a limited lateral and wide angle capability and are less likely to pick up relevant activities that are occurring outside the limits of camera vision. On occasions airspace restrictions do not allow UAVs to operate with the relative freedom of action allowed by manned helicopters.

5. In military operations the acquisition of targets and control of artillery fire and Close Air Support aircraft is an important role for battlefield reconnaissance and surveillance helicopters. Importantly, helicopters provide a man-in-the-loop with direct vision of the target area—thus facilitating quick decision making when Rules of Engagement are restrictive. This is increasingly important in current operations in Afghanistan where the avoidance of civilian casualties is absolute.

AGUSTAWESTLAND AIRCRAFT DEPLOYED IN AFGHANISTAN

6. *WAH-64 Apache*

The WAH-64 Apache, arguably, has the most sophisticated "sensor to shooter" capability currently deployed. The combination of the Aircraft Commander and the ISTAR and weapon systems all on the same platform significantly reduces the time to detect, decide and then to engage or not to engage the target. This process takes seconds rather than minutes. The fidelity of the on-board radars, infra-red and daytime TV surveillance devices, including the recently introduced Modified Targeting Acquisition and Designation System (MTADS), provide the crews with a combination of sensors that enable them to make instant decisions on Rules of Engagement.

7. *Lynx Mk7 and Mk9*

Following the introduction of the Apache, the anti-tank missile sight on the Lynx Mk7 has been removed. As a result it now has a reduced ISTAR capability, although it is still capable of fulfilling the reconnaissance and intelligence gathering as described in paragraph 3.

8. *Sea King Mk7 ASaC*

The Sea King Mk7 Airborne Surveillance and Control ASaC) platform started operations in Afghanistan in May 2009. It is equipped with an advanced pulse doppler radar enabling a Ground Moving Target Indicator (GMTI) mode to assist in detecting, tracking, reporting and identifying moving air and ground targets at long range. In addition, it has a control function which enables the engagement of land targets in conjunction with fast jets, attack helicopters and artillery. It is network enabled using its Link 16 capability and is able to share over 600 surface, air and land tracks to the Joint Force Commander. The Sea King Mk7 will become a force multiplier as its capabilities in Afghanistan develop. This has the potential to save UK and coalition lives through the early detection and engagement of enemy forces.

AGUSTA WESTLAND AIRCRAFT THAT COULD BE DEPLOYED IN AFGHANISTAN

9. *AW101 Merlin Mk3*

It is expected that the Merlin Mk3 will be deployed in Afghanistan in early 2010. A forward looking infra-red surveillance capability has been developed for the Merlin in response to an Urgent Operational Requirement (UOR) in 2008 to cover a manned ISTAR operational gap in Iraq. There is therefore an option to deploy this capability to Afghanistan should the MoD wish to do so.

10. *AW159 Wildcat*

The AW159 Wildcat (formerly known as the Future Lynx) will enter Army service from 2014 onwards and will significantly enhance the Army's ISTAR capabilities. The aircraft has a fully digital and integrated Open Systems Architecture that will enable crews and commanders to have greater situational awareness in support of both land and littoral/maritime operations. Equipped with a state of the art Forward Looking Infra-red (FLIR) Electro-optical System, the AW159 will be able to provide accurate position reports and targeting data. The sight has a Laser Range Finder and Designator for both ground and air forces. The aircraft is also equipped with the Bowman radio that provides secure voice and data, giving timely operational updates, with an Improved Data Modem for the passage of secure targeting data. Due to its modern design the aircraft will also have the future growth capability to integrate new and emerging ISTAR technology.

22 June 2009

Memorandum from Thales

INTRODUCTION

1. Thales is a global business that operates in aerospace, defence and security markets. We are a world leader in Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) systems, covering a broad range of capabilities from space surveillance, unmanned air vehicle based systems, airborne radar systems (eg Nimrod MRA4 and Sea King Mk7), electronic intelligence systems to tactical land systems (eg man-portable radars, handheld and vehicle mounted cameras and communications devices). These capabilities led to the competitive selection of Thales as the Prime Contractor for the UK's WATCHKEEPER programme, which is currently the largest tactical ISTAR unmanned aerial vehicle (UAV) programme in Europe.

2. This submission is based on the experience that Thales has developed in supplying ISTAR assets to the UK and overseas. We also draw on significant operational experience of providing ISTAR as a service to the military in both Iraq and Afghanistan. In addition to our technical expertise, in recent years Thales has also worked closely with both the Capability Area (ISTAR) and with MoD's Defence Equipment & Support to help to mature the ISTAR doctrine for the Direct, Collect, Process & Disseminate (DCPD) areas. This has often involved the use of Thales simulated environments to refine the efficient and coordinated use of a variety of ISTAR feeds in each of these functions.

3. Thales supplies the MoD with a wide variety of ISTAR systems across all military domains, which has given us a unique perspective on the requirements of different military customers. Our experience as prime contractor and systems integrator on major ISTAR programmes, including WATCHKEEPER, has required us to develop a particular expertise in integrating information from a range of ISTAR assets. The right mix and quality of ISTAR collection assets certainly remains very important. But in our experience, increasingly it is the ability to fuse information together from different ISTAR collection assets, with sufficient speed and accuracy to support real-time decision-making, which provides the critical battle-winning capability.

4. Thales is very proud to support the UK forces on current operations, through the timely delivery of new capabilities and through our rapid response to new requirements raised through the Urgent Operational Requirements (UOR) process. We continue to develop our ISTAR assets and to improve the support that we give intelligence analysts in exploiting existing ISTAR capabilities. The threat faced by our armed forces is continually evolving and we must continually develop our ISTAR capabilities, to ensure that they continue to receive the best possible protection.

SUMMARY

5. Every day in Afghanistan, ISTAR capabilities help the military to win battles and to reduce casualties. For example, the Thales Hermes 450 UAV based ISTAR system, acquired as a UOR, has revolutionised the way in which UK Armed Forces search for and track the enemy. This 24-hour system allows the early detection and interdiction of enemy threats, leading to much improved force protection. It is clear that the early visibility of threats provided by today's ISTAR systems saves lives.

6. The broad similarities in the use of ISTAR between Iraq and Afghanistan have allowed the military to develop and to refine the use and integration of ISTAR capabilities. But ISTAR requirements do not stand still. Technology is continually being matured that improves the quality, and often quantity, of ISTAR collection. As the number of systems and quantity of data increases, so does the need to integrate different feeds together into a single intelligence picture for human analysis. Innovation is continually applied to current ISTAR systems to allow the military to get more out of the systems that are currently deployed. In addition, as threats evolve this requires a continual evolution of requirements for future ISTAR systems.

7. In particular in asymmetric conflicts such as Afghanistan and Iraq, potential threats only appear visually and electronically on an intermittent and transitory basis. This means that it is important not just to detect them, but also to rapidly and securely pass the information to operational units so that they can respond by tracking or engaging the threat immediately.

8. Consequently, it is important that the MoD continues to invest in systems that quickly and accurately cross-reference and analyse the different sources of information available, and also provides secure communications networks that can rapidly pass that information and intelligence to those force elements on the battlefield directly facing the detected threat. Such investment in integrated ISTAR will ensure that MoD secures the maximum return from the considerable investment that has already been made in procuring sophisticated surveillance and reconnaissance platforms. For many years, Thales has been working with the British military and with other nations in Afghanistan to improve existing ISTAR capabilities and to help to make intelligence analysis more effective by fusing together multiple information and intelligence sources and then distribute it to the front line.

9. Often, given the nature of current operations, this support has been provided through UORs. But it is important to recognise that major equipment programmes are also in development that will transform the ISTAR capabilities of our Armed Forces. The WATCHKEEPER ISTAR programme, which we anticipate bringing into service in 2010, will for the first time provide a comprehensive network enabled ISTAR capability through the integration of a sophisticated suite of sensors, communications, imagery exploitation and dissemination systems. In an excellent example of current operations informing major equipment programmes, WATCHKEEPER is building on the lessons learnt from the Hermes 450 programme. The WATCHKEEPER system will not only provide a significant part of the deployed UK ISTAR capability, but will also have the capability to provide the management, exploitation and dissemination of other ISTAR assets.

10. Thales makes an essential contribution to the delivery of current operational ISTAR and UAV systems capability. Thales also supports many of our ISTAR systems using our own people deployed into the operational theatre. As a result, at any one time, Thales currently has personnel deployed in Afghanistan, supporting our equipment and providing Hermes 450 UAV capabilities to the military as a service. This very serious commitment illustrates the specialist skills that are required to support ISTAR systems. It also illustrates how industry is increasingly an integrated part of military capability and shares in the risk of delivering ISTAR support to the front line.

What contribution have existing systems in Afghanistan made to ISTAR capability?

11. Thales provides ISTAR systems to the MoD in the maritime, land and air domains; these systems have been extensively used both in Afghanistan and in support of Afghanistan missions. Many of these capabilities have been found additional new roles supporting the specific counter-insurgency tasks as a result of Thales working very closely with the MoD to adapt to the updated Tactics, Techniques and Procedures; this ensures that the users are able to operate our equipment to best meet operational demands. Whilst the majority of this equipment was initially procured from the long term Equipment Plan, Thales has also played a full role in providing new ISTAR capabilities through the UOR process. In Afghanistan Thales is providing the following ISTAR capabilities:

Hermes 450 Tactical UAV UOR (Thales Crawley, Basingstoke and Leicester facilities)

12. In June 2007, Thales was awarded a UOR contract by the UK MoD to provide UAV systems to support UK forces on current operations and provide an urgently needed ISTAR capability for UK forces. This UOR is being fulfilled by Thales through a highly innovative service provision contract, “ISTAR by the hour”, and is today delivering high-quality imagery, to enable the delivery of imagery intelligence to the Land Component Commander. Typical missions are to support convoy surveillance, battle damage assessment, tracking ground targets, forward reconnaissance and overwatch of own troop movements.

13. The contract includes the provision of Hermes 450 UAV systems, as well as training of the MoD staff in the use and maintenance of the system, and the provision of deployed Contractor Logistic Support (CLS) and programme management services. This UOR was delivered into service against an aggressive timescale. The capability has been delivered in several tranches, and Thales’ swift response enabled the first in-theatre delivery to be achieved on 14 June 2007. First flight was on 20 June 2007 and Initial Operating Capability (IOC) was declared on 5 July 2007. Since then the Hermes 450 has been flying regularly in support of operations, providing persistent ISTAR coverage, delivering very high quality visual and infra-red imagery, day and night. It has made a considerable difference to the UK capability enabling persistent surveillance and targeting. Since entering service in June 2007, the systems have flown more than 11,000 hours in Afghanistan (and a combined 20,000 operational hours with Iraq), with maximum continuous mission durations of up to 110 hours; this has been achieved through extremely high system reliability and availability.

14. The Hermes 450 systems are called upon to provide consistent and reliable ISTAR coverage over extended periods, and in-theatre Commanders have highlighted Hermes 450 as delivering truly reliable and outstanding performance for the UK Armed Forces. The Hermes 450 ISTAR capability allows immediate and rapid reaction to a threat, with unmatched flexibility and minimum maintenance to support UK forces in adverse conditions, eg temperature and terrain. Through a combination of sensors and persistence, the Hermes 450 system provides day and night support to all aspects of ISTAR, and has capability in each of the Direct, Collect, Process and Disseminate areas.

15. Thales is the only UK-based provider of UAVs currently offering UK ISTAR operational capability. Key benefits from this Thales system include: rapid entry into service; a “step increase” in dedicated ISTAR capability; enabling more efficient war fighting through safer, more timely and clear situational awareness for active operations and improved force protection and counter fires leading to reduced numbers of UK casualties.

Digital Joint Reconnaissance Pod (DJRP) (Thales Bury St Edmunds facility)

16. The DJRP is performing daily missions in Afghanistan on the Harrier Fast Jet; currently 85% of all Harrier missions are ISTAR focussed with the DJRP supporting Current Operations and Force Protection. This ISTAR requirement is anticipated to continue as the Tornado aircraft also are to be re-deployed to this theatre. The DJRP is providing imagery to support collection requests raised by both the UK and International Security Assistance Force (ISAF). Additionally the DJRP can respond to ad-hoc tasking in support of UK interests, including land based forces, troops in contact and the location of Improvised Explosive Devices. The DJRP imagery is analysed using the Thales provided Ground Imagery Exploitation System (GIES); which has recently been upgraded to analyse imagery from additional MoD sensors.

Sea King Mk7 Airborne Surveillance and Control (ASaC) (Thales Crawley and Leicester facilities)

17. Building on its success in the Al Faw Peninsular of Iraq during Operation Telic, the Sea King Mk7 ASaC has been deployed to Afghanistan to support troops on the ground through the use of its Ground Moving Target Indicator (GMTI) radar capability with Thales providing the radar and mission system. This capability enhances Force Protection by allowing Commanders and Troops on the ground to be aware of movement in their areas of interest/responsibility in order to prioritise protection activities.

Catherine Thermal Imager (TI)/Battlegroup Thermal Imager (BGTI) (Thales Glasgow facility)

18. Through the ESPIRE programme, the Scimitar Formation Recce vehicle has been upgraded with the Thales third generation Catherine MegaPixel (MP) Thermal Imager into the vehicle gunner’s sight. The design includes the integration of the Battlegroup Thermal Imager (BGTI) displays and fire control computer that enables the upgraded gunner’s sight to resemble a BGTI configuration benefiting from the BGTI support infrastructure. The reliability and high resolution imagery of the Catherine MP has received plaudits and is making a significant contribution to surveillance operations, providing longer range target identification and aiding the identification of IEDs.

19. Short-term support has involved Thales taking responsibility for the installation as part of Contractors on Deployed Operations (CONDO) whilst the longer term support is being addressed by Thales offering to incorporate the upgraded ESPIRE (enhanced sight periscope infra red equipment—the existing thermal imager gunners sight in the Scimitar Formation Recce vehicle), capabilities into the existing BGTI CLS contract.

Surveillance Target Location Systems (STLS) (Thales Glasgow facility)

20. Under a UOR, Thales has provided the Surveillance Target Location System (STLS) for deployment in Afghanistan in advance of the full Surveillance System & Range Finder (SSARF) requirement. The system allows troops on the ground to quickly establish the exact location and distance of enemy forces and determine the most appropriate and accurate mortar or artillery firepower to use. The first batch was delivered in January 2008 and immediately deployed in Afghanistan. Usage has grown since deployment and feedback has been excellent. One user commented: “The asset provided capable thermal STAR [Surveillance, Target Acquisition & Reconnaissance] to MFC [Mortar Fire Controllers] and snipers”.

Man-portable Surveillance and Target Acquisition Radar (MSTAR) (Thales Crawley facility)

21. The Thales MSTAR radar, which is issued to Battlegroups, provides indicators and warnings of approaching entities to enhance base and patrol security; the equipment is ideally suited to covering dead ground/blind spots and areas that are difficult to patrol. MSTAR is also issued to artillery Forward Observation Officers for target acquisition.

Nimrod R1 & MR2 (Thales Crawley and Wells facilities)

22. Thales provides ISTAR capabilities for both the Nimrod R1 and the MR2, with the Thales provided ISTAR Mission Support System (MSS) orchestrating a coordination role. These strategic assets support current operations across all ISTAR areas with intelligence being disseminated to lower levels than previously was achievable. ISTAR MSS allows the fusion of information and intelligence from different sources to allow the best assessment to be made.

What difference has ISTAR made to the security of UK deployed troops, for example in reducing the number of IED casualties?

23. ISTAR enhances the eyes and ears of the soldier on the ground; the various ISTAR capabilities allow the soldier to “see further” and to “look into blind spots”; it allows remote surveillance and the ability to covertly follow activities. The fact that the commanders, troops and intelligence staffs have access to more information allows better situational awareness and longer response times—it provides their indicators and warnings and cues military options. The specific detail of this question is however for the Ministry of Defence and not industry to answer, but it is clear from our work with the Ministry and the deployed users that the following Thales capabilities have assisted in enhancing security and locating IEDs, leading to reduced casualties:

Hermes 450 Tactical UAV UOR

24. The Hermes 450, provided by Thales under the Tactical UAV UOR, is regularly flying in support of Combat and Force Protection operations, directly providing enhanced and persistent ISTAR coverage with very high quality visual and IR imagery, day and night direct in theatre to ground forces. In the time since it entered service, the Hermes 450 has become an essential asset in the Land Commanders’ ISTAR toolbox enhancing the security of troops on the ground. The Full Motion Video (FMV) sensor and its derived intelligence is provided to Headquarters, deployed commanders and Forward Air Controllers via ground control stations and Remote Viewing Terminals (RVTs) allowing them to see and track the enemy and determine patterns of life.

25. The MoD has stated that the quality and utility of the Hermes 450 Tactical UAV System is far in excess of what has been available previously and that UAVs are proving to deliver an absolutely essential battle-winning equipment capability. The flexibility of the system allows the Users to watch for patterns in enemy activity and changes to those patterns as indicators and warnings to expected activities.

26. Despite the very high quality visual and infra-red imagery working in a congested communications network, the system allows the MoD Headquarters to communicate with the Ground Control Station to effect in-flight re-tasking. As a result, the quality and stability of the sensors provide a unique ISTAR capability in theatre. Hermes 450 is the FMV “platform of choice” in Afghanistan and, as a result, additional capability has been requested by the MoD and will be delivered by Thales.

Sea King Mk7 ASaC

27. Building on its success in the Al Faw Peninsular of Iraq during Operation Telic to discover watchtowers, minefields and routes, the Sea King Mark 7 Airborne Surveillance and Control (ASaC) helicopter has been deployed to Afghanistan to support troops on the ground through the use of its Ground Moving Target Indicator (GMTI) Radar capability. This capability enhances Force Protection by allowing Commanders and Troops on the Ground to be aware of activity in and around their areas of responsibility in order to prioritise protection activities. The Mk7 additionally has the ability to perform a command and control function and to cue other assets (especially UAVs).

The Thales Digital Joint Reconnaissance Pod (DJRP)

28. The DJRP, deployed under fast jet platforms,¹ is tasked on a daily basis to image base locations, likely enemy locations and attack sites and the locations where the Taliban regularly plant Improvised Explosive Devices; many devices have been identified and located using this asset in this manner. Thales has been working with the Defence Science and Technology Laboratories (Dstl) to improve further the use of DJRP imagery in this area across a number of platforms.

Man-portable Surveillance and Target Acquisition Radar (MSTAR)

29. The MSTAR, which is issued to Battlegroups, provides indicators and warnings about approaching entities to enhance base and patrol security; the equipment is ideally suited to covering dead ground/blind spots and areas that are difficult to patrol—reducing the need for soldiers to have to enter dangerous terrain. MSTAR is also issued to artillery observation parties for target acquisition aiding in calling both direct-fire and close air support.

Nimrod R1 & MR2

30. The Thales provided ISTAR capabilities for both the Nimrod R1 and the MR2 have provided both the Commanders and the troops on the ground with Indicators and Warnings with respect to enemy activity; the Thales provided ISTAR Mission Support System (MSS) has had a major role in orchestrating this support. These strategic assets have been able to support operations to much lower levels than previously have been achievable previously with the intelligence being provided to those with the highest priority.

To what extent has ISTAR increased the accuracy of coalition targeting and reduced civilian casualties?

31. Through the collection, processing, exploitation, analysis and dissemination of accurate and timely information and intelligence, the ISTAR process integrates capabilities from Coalition Joint Force Components to provide joint battlespace awareness. This awareness is essential for the successful planning and conduct of offensive and defensive operations, whilst minimising the risks to civilians, and fratricide. ISTAR activities are reducing the uncertainties in the decision-making process and in determining the enemy's intentions, as well as details concerning the high-value targets, which are important inputs to the planning, intelligence collection and targeting processes.

32. Sensor-to-shooter times are being markedly compressed and the accuracy of targeting data increased by the integration of information from space-based, air-breathing and ground based ISTAR systems. Access to intelligence from coalition databases and the use of historical data, coupled with cross-cueing information from collaborative sources and sensors are improving the precision of geo-location data, and reducing target location errors. The use of real time FMV for pre-engagement tracking and post attack battle damage information is enabling accurate decisions in order to achieve defined objectives. Collocating ISTAR sensor systems with munitions on the same platform is minimising the risks of misidentification error during any handover procedures between the sensor and the shooter. In addition, the joint use of ISTAR sensors with active targeting systems, (for example imaging sensors with integrated laser target designation, is eliminating the risk of targeting error from munition inaccuracies in its terminal phase.

33. The prevention of collateral damage is being achieved through an intelligence effort to identify the civilian infrastructure, within the possible effective weapon radii. Robust target analysis, comprising laws of armed conflict compliance, collateral damage estimation, target aim-point and attack direction selection, is being conducted to ensure the potential for civilian casualties is eliminated.

34. Current ISTAR systems provided by Thales and robust MoD practices are contributing to increased targeting accuracy and the reduced potential for civilian casualties.

To what extent are the right personnel in place, and trained, to deliver ISTAR in operations?

35. The training needs analysis that Thales has completed for the many ISTAR systems that we provide highlights the need for the correct resourcing and training of staff. Thales considers the complete span of potential resources in these analyses ranging from military staff through to Contractors Deployed on Operations (CONDO). The specific detail of this question is best answered by the MoD, however, it is clear from our work with the MoD and the deployed users that Thales can highlight the following:

Hermes 450 Tactical UAV UOR & Catherine Thermal Imager

36. For systems like the Hermes 450 Unmanned Aerial Vehicle and the Catherine MegaPixel Thermal Imager, Thales provides joint Military/Thales solutions to ensure that both the appropriate number of military operators and support contractors are trained. Thales reviews the training cycle with the user's training development organisations to ensure that the training is appropriate, up-to-date and of the correct duration. The system's Concept of Employment earmarked the roles and responsibilities of each actor in

¹ 85% of Harrier missions support ISTAR requirements.

the system and the training ensures that each role dovetails in with each other. In order to maximise the response to MoD, Thales is deploying suitably skilled staff to Afghanistan to provide both “help desk” support and maintenance; these CONDO staff work closely with the military users.

WATCHKEEPER (Thales Crawley, Leicester and Bury St Edmunds facilities)

37. When Watchkeeper comes into service Thales will ensure that the right personnel are in place and trained to deliver its full ISTAR capabilities. Experience is a key discriminator when assessing information to create intelligence assessments and products. Different levels of training and experience may bring different and/or wrong answers, additionally the ability to fuse multiple sources of information and intelligence is more likely to lead to the correct assessment. It is essential therefore that correctly trained analysts are provided to support major and sensitive decisions; examples are targeting and battle damage assessment.

Tactical Imagery Intelligence Wing (TIW)

38. Thales provides training to the Tactical Imagery Intelligence Wing, who are the recognised specialists in Tactical Imagery Analysis using the GIES. The MoD has recognised that it can improve use of its deployed analytical capabilities and that analysts need to have access to the available data, and to this end the MoD has identified a number of small Urgent Operational Requirements. These upgrades will take the current capability a small step along the path towards the end-to-end ISTAR capability that will be provided to the Land Component by WATCHKEEPER.

Thales Battlespace Transformation Centre (BTC) (Thales Crawley facility)

39. The Thales BTC facility is a key capability, allowing the evaluation of many aspects of warfare, across all the Defence Lines of Development (DLODs). The BTC has provided a significant contribution to the development of Thales’ ISTAR programmes, especially the maturing of the WATCHKEEPER solution to a complete ISTAR system, with capabilities in each of the DCPD elements. This will allow the MoD to build an integrated land ISTAR capability. Thales has provided ISTAR Pre Deployment Training to several Brigade Headquarters’ ISTAR staffs prior to their deployments to Afghanistan. This involved warfare experiments incorporating all DCPD elements, but focussed on ISTAR planning, management and tasking. This training was carried out using a Helmand Province based synthetic environment to allow the ISTAR staffs to better understand how to collectively use their ISTAR assets rather than use them individually.

40. A side benefit of this training was to allow the staff to gain an understanding of the terrain prior to deployment. With this facility Thales provides the UK MoD and its Allies with the ability to experiment concept of operation doctrine, training needs, best practices and realistic operational scenarios for ISTAR assets over the MoD’s Joint Multi-National Information Assurance Network. This cooperative and embracing approach with a wide dissemination of information to all those that need it is key to overall success in operations.

Have the benefits of Network Enabled Capability been realised in permitting a greater variety of sensors and weapons to be available on demand to commanders and troops on the ground?

41. Operations in Afghanistan have benefited from significant network capabilities, provided over a wide variety of infrastructures, compared with previous operations. This has enabled Commanders and troops on the ground to have unprecedented access to intelligence and ISTAR products from both UK and coalition sources. While not all of the assets are directly connected to the infrastructures, operators have developed Standard Operating Procedures (SOPs) to place the information on the correct infrastructure. Thales has been involved in providing the following NEC benefits:

Hermes 450 Tactical UAV UOR

42. The provision of broadcast services through Skynet, the in-country networks such as the microwave link between Camp Bastion & Lashkar Gah and the Thales provided ISAF wide area network, allow for the dissemination of relatively large intelligence products—the key problem area remains with the transmission of large raw data files. The Hermes 450 programme has made excellent use of the communications link between Camp Bastion and Lashkar Gah to deliver the Full Motion Video feed from the ground station to the Brigade Commander. As well as accessing the Hermes 450 full motion video via the groundstation, frontline troops on the ground can directly access the imagery feed through Remote Viewing Terminals.

43. Across the theatre, ISAF is working to common standards for Image Reference Libraries, Intelligence Product Libraries and Dataservers. As part of this, Thales has provided imagery storage and retrieval systems compliant with the Coalition Shared Database standards. Thales programmes such as WATCHKEEPER and ISTAR MSS are positioned to make the most of NEC once the networks are fully connected, this will enable their analysts to reach across systems to pull the best and most up-to-date data to match their needs.

Coalition Warrior Interoperability Demonstrator (CWID)

44. Thales has been demonstrating and de-risking these standards with the MoD at the Coalition Warrior Interoperability Demonstrator, where these have been experimented on and the issues have been highlighted and identified. The intelligence libraries must interface to and work with each other across defence infrastructures in order to maximise the benefits of NEC; a key part of this is the interoperability piece with coalition partners.

WATCHKEEPER

45. The WATCHKEEPER system as a deployed collection and intelligence processing capability is enabled to work with both the MoDs tactical and operational infrastructures. WATCHKEEPER can provide a bridge between these infrastructures and search and share data and products over both.

Nimrod MR2

46. The Nimrod MR2 has a level of NEC by means of electronic transfer from the operational area of real time imagery supported by Thales Wells provided MACAR full motion video library (for imagery downloaded from the MR2). This capability has supported Commanders and troops on the Ground through the dissemination of video to remote viewing terminals.

Sea King Mk7 ASaC

47. Additionally Thales has been working with the MoD to maximise the amount of intelligence that can be passed over the Link 16 link from the Sea King Mk 7 (ASaC) to the recognised maritime picture. The ultimate aim of this work is to add the intelligence generated by the maritime domain to the overall joint operational picture and the joint intelligence picture, especially in littoral operations, through the benefits of the NEC information infrastructure improvements.

What are the gaps in current ISTAR capabilities?

48. From the experience of Thales operations in theatre, there are some areas of ISTAR exploitation that the MoD is continuing to work on and Thales is supporting this ongoing activity. These areas include the reliable and accurate detection of a range of improvised explosive devices (IEDs) in complex environments, and ISTAR collection and exploitation across security boundaries. Thales has recently formed a dedicated Force Protection Business Unit which will act as a key portal for helping ISTAR to deliver effective solutions against these new and disruptive threats. Thales works closely with the Communications-Electronics Security Group (CESG) to provide suitable cryptographic products and guards to protect sensitive ISTAR sources, data and products. Thales is currently also working with CESG to resolve the issues of electronic working across the security domains within the information assurance guidelines.

49. In addition ISTAR collection to maintain persistent covert surveillance (both imagery and signals) which will require a networked mix of persistent airborne and ground based systems; Unmanned Air Systems will play an increasingly important role in this area.

50. WATCHKEEPER will bring an integrated capability connecting to MoD Information Infrastructures and providing a network of exploitation tools and imagery databases with the ability to search and request previously collected imagery. Users can then decide to use the existing imagery and allow the UAV system to be made available for other tasks.

51. Thales is working with MoD agencies to develop solutions for recognised gaps in operational ISTAR capability. These include:

- Real time reconnaissance and targeting, through the introduction of high performance data links within reconnaissance pods and UAVs.
- Enhanced sensor technologies, including advanced Infra red capability, multi sensor systems and fusion techniques.
- Improved dissemination of imagery based intelligence products, over existing tactical communications networks, increasing situation awareness and supporting collaborative operations.
- Integration of “ISTAR Collectors” on non ISTAR programmes, ie:
 - Starstreak Air Defence Alerting Device infrared scanner.
 - Battlegroup Thermal Imager.

What more needs to be done for the full benefits of ISTAR to be realised?

52. ISTAR is a support function to Commanders, and must deliver an accurate and timely “ground truth” of current and emerging situation. Combined with an educated and trained staff, this assures the proper context and understanding and gives the Commander sufficient time to make the right decisions and take action to achieve the required effects. To deliver this, ISTAR must not only provide the whom, what, where and when but also the how and importantly why specific adversaries act in specific ways. It is

intimately linked to Command and Control and when executed properly provides a predictive capability alerting Commanders to most likely actions of the enemy and neutrals; remaining ahead of their decision processes.

53. This process is in operation today, but is somewhat limited by the ability to integrate in a timely manner all of the data and information that is present within Defence, Other Government Departments and Allies' systems. To realise fully these benefits, a greater degree of sensor and information integration is required. This will need to adopt more automated assistance to analysts and supporting tools to better fuse vast amounts of information from various traditional and non-traditional sources into actionable intelligence.

54. Another key area that needs to be addressed is the ability to move sensitive ISTAR data rapidly and seamlessly across a network between different force elements from all three Services and our coalition partners. Such data is invariably classified and requires encryption. Current MoD encryption capabilities (technical and distribution) are not optimal to meet the increasing demands for rapid dissemination of ISTAR data. Unless this issue is addressed, the full benefits of ISTAR and NEC are unlikely to be secured.

55. Delivering many of the benefits of an end to end ISTAR capability can be technically easy to solve but commercially difficult to implement under conventional acquisition approaches. The systems that are required to cooperate to deliver the improved capability have been procured individually with the contractor with intellectual property (IP) vested within the supplier companies.

56. To ensure future operational agility and the best performance for the MoD will require collaboration within and between MoD and the providers of the current systems to work together to develop the first increment of a more open system of systems and unlock the restraining IP boundaries. An open ISTAR consortium could collaborate to fix today's problems and create an open environment for future competition.

57. In addition, the policy on information assurance and security could be reviewed to establish future evolutions of requirements and constraints. A growing operational "need to share" information, with the acceptance of greater risk will test current policy guidance.

58. The early steps of understanding the current "as is" situation and planning a route to an integrated and open ISTAR architecture is underway. Thales believes that the first increment of the DABINETT programme (providing the operational and systems architecture to support the UK's ISTAR in NEC) could be used to build this form of open framework, and incrementally deliver the operational benefits from March 2012.

To what extent are existing ISTAR systems and capabilities interoperable with coalition forces?

59. To date, interoperability even with own forces has been an area diluted to achieve affordability or timescale, as often interoperability requirements are undeliverable within the scope of a single project as the other systems have no reciprocal requirements or budget to uphold their end of the interoperability "handshake". Implementation of common standards on interoperability should avoid "air gaps" and "swivel chair" interfaces. Thales has provided ground exploitation systems that provide common processing and dissemination for reconnaissance pods as well as for targeting pods, from different legacy backgrounds, in order to share intelligence reports and other end products, utilising NATO interoperability interface standards.

60. Exercises such as CWID show that technical interoperability with Coalition forces is feasible if MoD is able to provide the policy and intent. For CWID 2008, DEC Command Control Information Infrastructure funded Thales to provide the UK/US interoperability for the exercise. Exercises such as CWID and the NATO Multi-sensor Aerospace-ground Joint ISR (intelligence, surveillance and reconnaissance) Interoperability Coalition (MAJIC) exercise show that industry can collaborate and demonstrate the interoperability of their systems. These events are key to showing the interoperability claims made by industrial parties. Also, it is often neither the ISTAR System nor the process that is at fault but the infrastructure and policy upon which operation of the system is mandated. Exercising the target systems within a suitable interoperability environment brings out these issues and helps to change often ingrained culture preventing adoption of new security solutions and processes to achieve the required interoperability.

61. Thales has recently demonstrated to MoD integration of capabilities from a number of leading ISTAR players to prove interoperability between UK systems and the NATO MAJIC compliant coalition shared database, as well as a live search of US resources. The demonstration included search and retrieval of imagery and intelligence over live Skynet satellite Information Dissemination System (IDS). Imagery products were only pulled across the network if the required search criteria was met; this allowed efficient use of bandwidth. Exploitation of still images was undertaken on third party software that is in-service with MoD and video was exploited by Thales FMV tools from the Watchkeeper programme. On completion of

the analytical task the relevant imagery and imagery derived product would be stored at the local node and the demander sent a hyperlink when informed of the completion of their task. The operational demander could now utilise the library client software, as a means of retrieving their product.

62. At present, MoD via DG Info, does not mandate standards for joint or coalition ISTAR interoperability but the MoD's appetite to do this does appear to be changing. If MoD wishes to own the ISTAR Architecture, it will need to mandate a number of open standards to enable future interoperability. Thales supports this approach and as a strong supporter of the CWID and the NATO MAJIC exercises, believes that these would be good opportunities to explore the implementation of these standards.

What lessons can be drawn from current operations for developing future capabilities?

63. Current operations have exposed a continued and enduring need to adapt existing capabilities for application to asymmetric warfare and for rapid acquisition via UOR of new capabilities to fill operational gaps. A rapid evolving threat and greater need to operate within coalition force structures has also exposed the need to grow Thales capabilities within a defined end-to-end architecture.

64. A clear lesson from the current operations is in the need for agility to respond to changing threats. To deliver this operational tempo demands a mix of acquisition agility and agility in the development of new ways of working, training and sustaining capability. The largest contributor to this is an incremental approach that defines a need and rapidly establishes a "good enough" initial capability that can be fielded early and developed forward, or if appropriate replaced with more suitable future increments. Important to note is the need for these increments to be capabilities integrated across the Defence Lines of Development and not merely new items of equipment.

65. To enable a number of ongoing capability increments to retain interoperability and cohesion, a planned target architecture is required. This will enable increments to be developed within well understood boundaries and interfaces. This will support capability growth in the right directions.

66. The adoption of these lessons for future capabilities could be realised through an alternative acquisition approach that establishes the overall architecture and open standards and then identifies specific capability needs, develops prototypes or concept capabilities, experiments with these capabilities and then procures an initial increment for early entry into service. Future increments will build upon the earlier work and operational lessons to deliver the evolving capabilities under a through life capability management process. This will eliminate the mindset of old "legacy" capabilities and "big bang" replacements and will encourage a better husbanded capability and value for Defence approach to achieve agility ahead of emerging threats. The early establishment of the target open architecture is key to ensuring success of this approach.

67. Thales sees this approach in action through the informing of the WATCHKEEPER programme by the successful operation of the Hermes 450 Tactical UAV UOR. Lessons identified on current operations are being used by Thales and the MoD to improve the WATCHKEEPER capability and ensure successful entry into service to meet the operational demands then pertaining, rather than those perceived at the contract award. The learning of lessons and building on the process of capability integration is already underway, and ensures that WATCHKEEPER a solid platform for future capability growth as a networked land ISTAR capability.

68. A through life capability approach is also seen on the Sea King Mk7 ASaC, where six monthly enhancements are provided through the integrated operational support programme, with Augusta Westland and Selex, to ensure management of obsolescence and delivery of the required capabilities. This approach in collaboration with the user community over many years has enabled the rapid implementation of the Ground Surveillance Modes that were so successful in Operation TELIC and will be used to support the protection of ground troops in the Afghanistan theatre later this year.

22 June 2009

Memorandum from General Dynamics United Kingdom Limited

INTRODUCTION

1. When effective, ISTAR provides the right actionable intelligence to commanders at the right time, to achieve the right effect.

2. British military doctrine is founded on agility and Land Manoeuvre, which is comprised of both Air and Ground Manoeuvre. On current operations, the trend is increasingly for the establishment of temporary groupings with high levels of integration, primarily between the air and land forces to deliver accurately targeted effects.

3. To be effective, forces require shared situational awareness (SA): essentially knowing "where am I, where are my colleagues, where is the enemy?" Communications networks enable the sharing of underpinning Situational Awareness data. When supporting joint operations, airborne force elements need to connect to information on the position and activity of both friendly and hostile forces.

4. Efficient delivery of joint and coalition ISTAR capability can be achieved by the synchronisation of processes and systems across the intelligence cycle, which is normally broken down as:

- Direct.
- Collect.
- Process.
- Disseminate.

5. This evidence provides a view, in the context of General Dynamics UK's ISTAR capability, on whether NEC's benefits have been realised in permitting a greater variety of sensors and weapons to be available on demand to commanders and troops on the ground. It identifies current gaps in ISTAR capability, provides suggestions on what more needs to be done to realise the full benefits, and identifies some lessons that can be drawn from current operations.

6. In this evidence, General Dynamics UK stresses the need for better information management and Network Enabled Capability, rather than solely buying more and more sensors. In short, General Dynamics UK works with the MoD in a shared aim to use better what the UK already has, improving the quality rather than simply overloading the people at the heart of the ISTAR enterprise with a greater quantity of information.

ABOUT GENERAL DYNAMICS UK

7. General Dynamics UK employs over 1600 people. Based in the UK for over 46 years, it is a key supplier of avionics to the UK's fixed wing and helicopter fleets and is a leading systems integrator of Armoured Fighting Vehicles, security and resilience technology, and capabilities which enable battle-winning military command and control through information dominance.

8. General Dynamics UK has the experience to act as a system integrator right across this ISTAR chain, from electronic systems within collection platforms and ground stations to the exploitation and provision of intelligence products to the decision maker. This is a critical UK industrial capability.

9. The ISTAR capability of General Dynamics UK has grown organically from 1962, as an avionics manufacturer, to a leading provider of ISTAR solutions that provide actionable intelligence to the right person at the right time in order to achieve the right effect. The Company is the prime systems integrator delivering the flagship Bowman system, which provides secure voice communications, a tactical internet and advanced situational awareness on operations to the UK Armed Forces. Bowman covers a wide range of fixed and mobile command centres, soft-skinned and armoured fighting vehicles, man-portable systems, warships and some battlefield helicopters, including Chinook and Merlin. Amongst other advances, the latest incremental enhancement of Bowman, known as BCIP5, makes more extensive use of secure data for communicating situational awareness.

10. General Dynamics UK is also a leading player in the integration of Network Enabled Capability into UK airborne platforms, both helicopters (Apache Bowman Connectivity and Future Lynx) and fixed wing aircraft (Tornado, Harrier, and Typhoon). Building on the use of Gateway technologies such as Link Independent Format and Data Forwarding algorithms together with its Bowman experience, General Dynamics UK is leading a team developing a demonstrator for the integration and dissemination of situational awareness data from multiple sources into a shared picture of the battlespace, the Combat ID Server.

What are the gaps in current ISTAR capabilities and what more needs to be done for the full benefits of ISTAR to be realised?

11. To realise the full benefits of ISTAR and to gain the maximum productivity from the Ministry of Defence's investment in people and equipment, it is necessary to invest adequately in the connecting infrastructure. That infrastructure needs to be robust, secure, interoperable with other nations, and available when needed to support tasking, information management and data sharing, storage, archive and retrieval. A robust capability to federate users and share existing data would deliver an immediate reduction in the number of unnecessary reconnaissance missions undertaken in response to information requests submitted by Britain's commanders in the field or their leaders, both in the UK and through the coalitions in which they serve.

Direct

12. This is the process of translating commanders' specific needs for information and knowledge of a particular location, situation or group of people, into a set of orders to collection platforms, such as UAVs, aircraft, ground-based sensors, intelligence-gatherers, and ships. Collection platforms or assets are drawn from a number of sources: national (controlled and allocated at the strategic level and/or by other government departments); coalition; joint (controlled and allocated by operational level headquarters) and tactical (from all three armed services). Each collector is directed via a generally well understood process within its own command structure, for example Tornado GR4 (fast jet) or Reaper (UAV). However, knowledge and understanding across these silos is limited, and optimising resources is a challenge since each

community has its own, often internally generated priorities. For example, a ground commander might request an image of a particular road when planning his unit's next patrol in that area. Without joined-up collection planning, he might be unaware that detailed photographs could potentially be (or may already have been) taken by an RAF fast jet on its normal mission, and therefore there is no need for the delay and resource involved in sending a UAV or a helicopter specifically to collect that image. However, making that information easily available and searchable is by no means easy.

Collect

13. This is the actual gathering of information, for example through still and video cameras, signal intercepts, radar scanning, and other forms of surveillance mounted on aircraft, ships, vehicles or on the ground. Planning for Collection can be sub-optimal as a consequence of a weakness in understanding what is available, what strengths and weaknesses characterise each collector, and how they can work together. In this field, for example, General Dynamics UK has considerable experience in providing video recorder and reconnaissance management systems for fast jets, and is the MoD's prime contractor for the Cortez 2 system being delivered as an urgent operational requirement.

Process

14. This essentially is a human activity which turns raw data into meaningful information. This is achieved by people such as trained analysts, and supported by specialist technology. Most ISTAR system acquisitions have tended to include the Processing element as part of the overall system procurement. These individual system procurements have rarely been designed to be interoperable with each other. The MEC TDP study (cf para 30), undertaken by General Dynamics UK as the MoD's prime contractor, addressed the lack of an overall blueprint to allow any system to talk to any other.

Disseminate

15. There is a need to disseminate information from the ISTAR enterprise out to the commanders and soldiers on operation. These may be inside the ISTAR enterprise or outside it, but they need information in a format that is useful and meaningful to them and in time to meet their needs. This information exchange can only take place where sufficiently robust and secure communications networks exist. For example, the Bowman voice and data network allows messages based on ISTAR outputs to be transmitted to voice radio or by messages, with a very high probability of their being received quickly by combat units on the ground. In Afghanistan a commander might send a revised order within seconds, based on ISTAR information of a new group of Taliban fighters being identified on a patrol route. This data network, known as a tactical internet, allows position reports to be exchanged and orders to be rapidly disseminated, and is to be further enhanced by the next Bowman increment, BCIP5, which is currently being rolled out to the Army's front line commands.

Personnel

16. Although ISTAR may give the initial impression of being entirely about technology, it relies fundamentally on people.

17. The human factor is paramount: people become tired, react differently when under varying degrees of stress, and perform at different levels in their ability to absorb and process information. Overload is a real risk with more and more sensors being employed; much of the pioneering science in the ISTAR field is therefore concerned with how to collate and present information in a way that is humanly manageable.

18. Given existing shortages in skilled intelligence analysts, it is critical that these highly valuable people are treated allocated to the highest priority tasks in accordance with operational demand. However, since they work for a number of different organisations, there is a need to make their skills widely available. This can be achieved by ensuring that collected material, analysts and their customers are available via a network, whether in the UK, deployed on operations or part of a coalition-wide enterprise.

19. The UK's ISTAR operators, taskers and decision makers require high levels of competence underpinned by education in the principles of ISTAR, as well as specific training. Truly representative training is required, whether in exercises or synthetic environments, to enhance the skills of personnel whose prior experience may not have adequately prepared them for this complex activity. For example, teams responsible for ISTAR effects are frequently aircrew who, although highly trained and competent, have seen only their aircraft type/specialisation, or intelligence staffs who have little training or experience in aircraft or ground operations.

Tasking Processes

20. The collection coordination and intelligence requirements management process is lengthy and information delivered after the Last Time Of Intelligence Value (LTIOV) will often be useless, misleading or at best not longer relevant. Whilst the concept of tasking through the command chain, holding assets at appropriate levels works well in certain scenarios, the situation in Afghanistan (and Iraq) requires a much faster and responsive system to be employed, in order to gain immediate and lasting effect on the battle space.

21. Overall, the major need is to enable an enterprise-wide approach across organisations and across specific intelligence disciplines. To achieve this requires additional investment in enabling technologies, together with the right levels of education and training.

An example: maximising effectiveness and benefits from the helicopter fleet

22. At a basic level, platforms such as ships, aircraft and ground vehicles without the ISTAR capability they need are blind, deaf, and very vulnerable. At the same time, a major benefit of an agile and joint ISTAR enterprise and the shared situational awareness it brings is the ability to optimise the use of the UK's own and coalition resources. Understandably, discussion on the effectiveness of the UK's deployed helicopter force, on which the Committee is currently conducting a separate inquiry, has focused on the availability of aircraft. However, the helicopter fleet is itself an example of how a comparatively moderate investment in Network Enabled Capability could multiply the benefit gained from buying and deploying expensive platform assets such as helicopters.

23. Connectivity to battlespace networks could enable better force protection since UK forces are aware of the positions and status of other friendly (and hostile) forces. Knowledge of the precise location of helicopters enables more efficient re-tasking. This need has been recognised through the provision, by UOR, of the Helicopter Asset Tracking System (HeATS); this provides an interim, partial solution which enables battlefield commanders at Brigade HQ to track the locations of their helicopters. General Dynamics UK demonstrated how this information can be used more widely to augment the Bowman land picture at CWID in 2008 and this approach also forms part of the Combat ID Server Technology Demonstration Programme.

24. Providing helicopters on the battlefield with greater access to networked information could make a significant contribution to command and control decision cycles, and dissemination of information and orders. Data networking in particular, which provides shared situational awareness, provides the capability for more efficient and effective use of military resources, particularly those which are centrally controlled by higher command. Data allows aircrew, commanders and embarked forces to gain more comprehensive and accurate situational awareness than by traditional voice reporting. It can improve aircrews' understanding of the whereabouts and tactical situation of ground forces they are supporting, enabling pilots to fly optimal approach and delivery profiles. It also ensures that the location of troops in transit is known at all stages of a mission.

25. In August 2005 a system devised by General Dynamics UK to achieve an affordable solution to the integration of Bowman into the Apache helicopter, the Apache Bowman Connectivity (ABC) system, was declared In Service. This gateway solution between Bowman and the Apache data networks saved MoD the considerable costs that would have been associated with re-qualification of the Apache airframe.

26. In 2006, General Dynamics UK was tasked by AgustaWestland to develop the Tactical Processor for the Future Lynx helicopter. This incorporates a Bowman data terminal, and was required for Main Gate approval of the Future Lynx programme itself. The product development work of this capability is now largely complete. Flight trials are scheduled for 2010.

27. The potential of effective data networking and communications was identified in the Air Manoeuvre Information Infrastructure (AMII) study in 2004 which sought to address the interaction between air and ground assets. General Dynamics UK supported an initial trial which achieved all its objectives, including the feasibility of connecting relatively high speed airborne platforms to slower speed land-based data networks. General Dynamics UK has since maintained the AMII flight trials equipment to support further potential trials.

28. In short, a comparatively moderate spend on Network Enabled Capability can multiply the benefit gained from buying very expensive assets such as helicopters.

What lessons can be drawn from current operations for developing future capabilities?

29. A mixture of operational and acquisition experience shows that there is a need for a balance to be struck when defining the requirement for any system. It is therefore necessary to design for incremental or spiral improvements, but these can only sensibly be implemented against an understood "blueprint" for interoperability. Such an approach also requires support from the highest echelons of DE&S to ensure that key enablers for future improvements are not discarded as trade-offs. In this regard, it is hoped that the Key Systems Advisor initiative will improve planning and delivery processes for interoperability.

30. General Dynamics UK delivered a technology demonstrator programme, the Modular Exploitation Capability (MEC TDP), to MoD in 2005 which showed in a series of demonstrations how a system of systems approach could be achieved across a range of existing and future, planned acquisitions. This work has been continued internally and further tested at Coalition Warrior Interoperability Demonstrations (CWID). In particular, General Dynamics UK has led customer thinking in resource tasking and allocation processes and how they might best be implemented to achieve improved efficiency and effectiveness.

31. Bandwidth is a scarce commodity that is going to become more expensive for MoD. Systems and interoperability solutions need to be designed with this in mind while understanding that the US is unlikely to allow itself to be limited in this area for some time to come. It is important that this factor is taken into consideration at an early stage of the architecture and system design process.

32. Finally, the experience of our forces in theatre evolves rapidly. Rapid and comprehensive de-briefing of developments in theatre, both to MoD and to the UK's defence industry, is vital if experimentation and technological innovation is to keep pace with the needs of the soldiers on the ground.

24 June 2009

Memorandum from The Boeing Company

In response to the House of Commons Defence Committee's request for evidence regarding its inquiry into the contribution of ISTAR to operations, The Boeing Company is pleased to submit the following evidence. In this document we provide information about: The Boeing Company; Boeing Defence UK Ltd; Boeing's ISTAR platforms and domain knowledge, including Network Enabled Capability, ScanEagle, E-3D AWACS, Apache AH MK1 and a concluding statement.

GENERAL INFORMATION

1. Boeing is the world's leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft, with capabilities in rotorcraft, electronic and defence systems, missiles, satellites, launch vehicles and advanced information and communication systems. The company's reach extends to customers in 145 countries around the world and Boeing is the number one US exporter in terms of sales. Headquartered in Chicago, Illinois, USA, Boeing employs more than 160,000 people in more than 70 countries.

2. Boeing has a long standing relationship with the UK dating back almost 70 years and today the UK remains a critically important market for the company, as a supplier base and a source of technology partners. Boeing's annual spend in the aerospace industry supports thousands of jobs around the UK, in the process generating intellectual property and facilitating exports.

3. Boeing typically sources more from the UK than from any other country in the world, except the USA. In 2005, the company bought more than \$1billion of services and materials from around 300 UK suppliers. There are currently more than 600 Boeing UK employees, in locations from Perth to Gosport.

4. The Boeing Company also has an extensive network of industrial and academic partners and suppliers across the UK. Boeing works with a number of Universities in the UK and has established multi-year collaborative research and technology relationships with several including Cambridge, Cranfield, Southampton and Sheffield.

BOEING DEFENCE UK LTD

5. A subsidiary of The Boeing Company and a business unit of Boeing's Integrated Defence Systems, Boeing Defence UK Ltd currently has employees at 20 locations throughout the UK supporting Ministry of Defence (MoD) and US military programmes. Boeing Defence UK is strengthening its ability to accommodate future business growth as it continues its alignment with the MoD's Defence Industrial Strategy (DIS) which calls for delivery of UK military capability through the development of UK-based expertise and technology.

6. Boeing Defence UK is positioned to support the through-life system-of-systems programme management to complex defence programmes. Along with engineering and integration, as an integrator, Boeing Defence UK delivers through-life capability and through-life technology management, as well as alliance development and supply chain management.

7. One such way Boeing Defence UK is delivering capability is through the company's Analysis, Modelling & Simulation facility, The Portal, located in Farnborough with partner QinetiQ. The Portal enables future military hardware and software solutions to be assessed in a variety of operational environments. Comprised of personnel from Boeing Defence UK and QinetiQ, The Portal is tasked with providing a robust experimental architecture including a realistic scenario, detailed mission briefs and, most importantly, a rigorous analysis plan.

8. Delivery is a cornerstone of business for Boeing Defence UK. Boeing's extensive capabilities can be seen in the variety of platforms utilised by the UK armed forces, enhancing operational effectiveness. From the C-17 Globemaster III transport aircraft and the heavy-lift capability of the Chinook, to the Apache AH MK1 attack helicopter, Boeing platforms and the services provided to support these and other platforms, are making a difference to the frontline.

NETWORK ENABLED CAPABILITY

9. Boeing as a system-of-systems integrator has vast expertise in coalescing sensors and advanced communications technologies to link soldiers with both manned and unmanned ground and air platforms and sensors. In order to amplify operational effect, soldiers on the frontline can now be linked to a wide range of weapons, sensors, and information systems by means of mobile networks that enable unprecedented levels of interoperability.

10. Boeing embeds Network Enabled Capability (NEC) into the core of all its capabilities world-wide. Boeing believes that NEC offers commanders the decisive advantage through timely exploitation of information and intelligence that enhances operational effectiveness on the battlefield. Implementation of NEC is through the coherent and progressive development of defence equipment that includes software, processes, structures and individual and collective training. Analysis, Modelling, Simulation and Experimentation is becoming increasingly well recognised as a vital component in helping the UK's armed forces understand the complexity of integrating the ISTAR process—Collection, Process and Dissemination—and associated equipment. The Portal facility in Farnborough, is a collaborative project between Boeing and QinetiQ that combines the necessary skills and tools to help the commander understand available courses of action. The power of the network for increasing capability is well known however, Boeing's platforms are able to work effectively within the network, but also importantly they can deliver effective combat power in a stand alone manner. With that in mind the following paragraphs will, in accordance with the scope of the inquiry, outline Boeing's platforms currently delivering military capability.

SCANEAGLE

11. Boeing and its subsidiary the Insitu Group developed and built a low-cost, long-endurance autonomous unmanned vehicle, called ScanEagle. ScanEagle is based on Insitu's Seascan miniature robotic aircraft and draws on Boeing's systems integration, communications and payload technologies. ScanEagle's standard payload includes a stabilised electro-optical camera that allows easy real time tracking of stationary and moving targets. With the USMC ScanEagle has flown many thousands of hours providing persistent low-altitude reconnaissance that delivers a coherent intelligence picture over some of the world's most complex operational theatres.

12. The ScanEagle system also has been used to support the MoD's Joint UAV Experimentation Programme (JUEP), through an industry team that includes Thales, QinetiQ and Boeing. During trials conducted off the coast of Scotland, ScanEagle was successfully controlled from a Royal Navy warship, proving its ability to support maritime as well as land based operations.

E-3D AWACS

13. The E-3D Sentry, Airborne Warning and Control System (AWACS), based at RAF Waddington, has been in service with the RAF since the late 1980's and remains today an important component of the ISTAR triad, that additionally includes the Sentinel R1 along with the Nimrod R1. The fleet of seven E-3Ds perform airborne and naval surveillance, command and control (C2) as well as communications functions.

14. The UK E-3Ds were produced in the AWACS standard configuration, with some system improvements, and are powered by GE/SNECMA CFM-56-2 high-efficiency, turbofan engines. Enhancements added to meet the United Kingdom's unique mission requirements include an enhanced maritime radar capability, a probe refuelling system to augment the existing boom receptacle for in-flight refuelling, a digital recorder for mission audio transmissions, improved radio equipment and United Kingdom provided Electronic Support Measures (ESM), for passive listening and detection capability.

APACHE AH MK1

15. The Apache has been in service with the MoD for over four years and is making a major contribution to operations in Afghanistan. The aircraft's systems have the ability to take part in networked operations as well supporting troops on the ground in a close air support role.

16. The aircraft can operate in all weathers, day or night and can detect, classify and prioritise up to 256 potential targets at a time. Apart from the distinctive "Longbow" mast-mounted radar, the aircraft is equipped with a 127x magnification TV system, 36x magnification thermal imaging, and 18x magnification direct view optics. Apache Longbow can carry 16 Hell-fire "fire-and-forget" anti-armour missiles, 76 2.75in rockets and a 30mm chain gun. The latest Apaches are able to control ISTAR assets such as tactical UAVs from within the cockpit.

MULTI-MISSION CAPABILITIES

17. Boeing's platforms are synonymous with multi mission capabilities and in the maritime surveillance and control domain, the P-8A Poseidon, combines long-range anti-submarine warfare, anti-surface warfare, intelligence, surveillance and reconnaissance capabilities. Capable of broad-area maritime and littoral operations, the P-8A will influence how the US Navy's maritime patrol and reconnaissance forces train, operate and deploy. On board P-8A, all sensors contribute to a single fused tactical situation display, which is then shared over both military standard and internet protocol data links, allowing for seamless delivery of information amongst U.S. and coalition forces.

18. Boeing's team is developing the P-8A Poseidon for the US Navy. The US Navy plans to purchase 108 P-8As, with initial operational capability scheduled for 2013. In January 2009 Boeing was selected to provide eight P-8I long-range maritime reconnaissance and anti-submarine warfare aircraft to the Indian navy. India is the first international customer for the P-8 and interest has been expressed by many countries.

CONCLUSION

19. This submission has sought to provide information on a range of Boeing ISTAR programmes and platforms. Boeing is committed to further developing ISTAR capabilities and is developing technologies on-shore in the UK through its own endeavour and also in collaboration with industry partners.

19 June 2009

Memorandum from the Ministry of Defence

How are the various ISTAR capabilities being managed and coordinated: who has overall Command and Control in the UK and on operations?

1. Within the UK and when not deployed, Command and Control (C2) of ISTAR capabilities lies with the Front Line Commands. On operations, all ISTAR capabilities within the Joint Operations Area are generally² under the Operational Command of the Chief of Joint Operations (CJO), based at the Permanent Joint Headquarters in Northwood. Operational Control and Tactical Command are then further delegated depending on the nature of the capability. In Afghanistan, ISTAR assets that are organic to Commander Task Force Helmand (TFH) (eg Tactical Unmanned Air Vehicles (UAVs)) are tasked in direct support of UK forces. Non-organic UK ISTAR assets are routinely under International Security Assistance Force (ISAF) Operational Control and may be tasked in support of Coalition as well as UK forces. The senior UK Air Officer in Theatre (the UK Air Component Commander) has Tactical Command of these assets and therefore retains oversight of their employment. This relationship works well, contributes to Coalition burden sharing and enhances the relationships with our Coalition partners and the support they provide to UK forces. Tasking requests for non-organic assets are prioritised by the Joint Intelligence Operations Centre—Afghanistan (JIOC-A) in accordance with the Commander ISAF Intelligence Collection Priorities, and the collection assets are then apportioned by the Coalition Combined Air Operations Centre (CAOC).

In general terms, C2 of ISTAR capabilities is retained at as high a level as practical in order to maximise efficiency and effect. Organic assets provide assured and close support and are highly valued by commanders. On the other hand, high demand for information and a finite supply of capability inexorably demands tasking flexibility and high-level prioritisation.

What contribution have ISTAR capabilities made to operations in Afghanistan?

— *What difference has ISTAR made to the security of UK deployed troops, for example in reducing the number of IED casualties?*

2. ISTAR is a vital joint enabling capability for operations. It aims to provide an operational commander with the situational awareness and understanding needed to make well-informed decisions on operations. Effective ISTAR relies on combining the output of many sensors ranging from space-based surveillance to human observation. It is a command-led activity that draws together capabilities across operational environments and the three Services. This gives the commander access to a wide spectrum of capabilities to deal with many different situations. Although each ISTAR capability has utility on its own, experience dictates that a layered approach, using the full spectrum of available ISTAR capabilities works best. The layering of assets can either be pre-planned or reactive through dynamic re-tasking depending on the nature of the incident and the priority it attracts. ISTAR support to troops provides increased situational awareness and can help with the timely and effective targeting of enemy forces while reducing the risk of friendly fire or non-combatant casualty incidents.

3. The security of deployed troops is termed “Force Protection” and ISTAR assets and capabilities are widely employed for this purpose. Coalition ISTAR assets are also used to assist with the Counter-Improvised Explosive Device (C-IED) campaign, to detect possible enemy force IED teams and provide a route clearing capability that can highlight areas of risk. There are a number of examples where friendly ground forces have been forewarned by ISTAR assets of areas which might contain IEDs and this helps to minimise the risk of sustaining casualties and on a number of occasions has prevented potential casualties.

4. Within Coalition operations in Afghanistan, ISTAR can support all stages of operations. Initially this involves locating, identifying and assessing the intentions of the enemy and moves on to developing detailed information such as pattern of life in the vicinity and activity of potential targets. ISTAR also assists with the analysis of information after an incident and subsequent development of new tactics, training and procedures. A major challenge throughout is the co-ordination of the wide variety of available ISTAR capabilities—from Human Intelligence (HUMINT) through to Signals Intelligence (SIGINT). Persistent Wide Area Surveillance (WAS) is regarded as a key, albeit developing, capability. It gives vital situational awareness and reduces the requirement for potentially high-risk ground manoeuvre. Other sensors such as high-resolution reconnaissance cameras or full-motion video surveillance can be brought to bear to focus on detail and refine the intelligence picture. The aim is to provide a coherent end-to-end “Scan-Cue-Focus”

² Not all operations worldwide are necessarily under the Joint Command of CJO.

capability enabling commanders to conduct effective, timely decision-making and especially to take action to prevent an event happening. WAS will also help with the more efficient management and allocation of often scarce ISTAR assets, thus increasing asset availability for tasks such as force protection.

— *To what extent has ISTAR increased the accuracy of coalition targeting and reduced civilian casualties?*

5. Coalition targeting is a tightly regulated activity. Depending on the particular circumstance, there is a range of criteria that need to be satisfied before a target can be prosecuted, including target identification and the proximity of civilians. ISTAR is one of many strands of activity that contribute. ISTAR helps our forces to meet the criteria more readily, although there are many demands on ISTAR capability. ISTAR also assists in timely battle damage assessment. But ISTAR availability and utility can be constrained by factors such as weather and environmental conditions.

What are the pinch point trades that affect the delivery of ISTAR capability? What are the shortage levels in each of these trade areas? What effect are these shortages having on the UK's existing and future ISTAR capability?

6. Across the three Services a large number of trade areas contribute to the delivery of ISTAR capability.³ This allows for a degree of flexibility in managing the impact of any manning shortfalls in individual areas. Manning shortfalls in these groups vary widely and may apply at different levels within a trade group. The ones of particular concern from the point of view of current operations are Linguists, Human Intelligence Operators, Image Analysts and Royal Engineer (Geographic) and manning shortfalls in these areas range from 10% up to around 40%. The impact on current operations has been minimised although to some extent with impact on harmony guidelines. Measures are in place to address shortfalls. More specifically:

Linguists

7. We face a number of challenges, for example: shifting requirements for specific language skills, long training periods due to the complexity of the languages and the high levels of competence demanded and competition with OGDs and the civil sector to recruit from the same limited pool of talent. We expect demand for linguists—both military and civilian—to grow over the next few years. Shortfalls are being proactively managed within the Department, with alternative methods of delivering capability, such as the use of contracted linguists, being utilised. Priorities are kept under constant review, given the importance of this capability to operations.

Image Analysts

8. On the military side, recruiting and retention levels have been low, in particular at the lower rank level. For civilians, past recruitment campaigns have been successful and it is envisaged that this will continue. There has recently been an increase in recruitment across the board which has been encouraging but operational requirements have increased in the past few years and there will need to be further growth if manning has a chance of recovering to the required level in the medium term. There will continue to be a need for careful management of posts to ensure front line support is met.

Human Intelligence Operators/Interrogators

9. Manning is at or close to current requirement but we face an imbalance between Basic and Advanced level qualified personnel. While in the minority, the more experienced Advanced personnel bear the brunt of operational demand and are key to training. While there is little evidence to suggest that this imbalance is having a negative impact on current operations, it will be important to continue to monitor and assess the situation. Over the next few years the need for trained personnel is expected to grow significantly but it takes in the order of four years to train Human Intelligence Operators in this high calibre niche capability.

RE (Geographic)

10. The Geospatial Intelligence and Information output of these personnel is a key enabler to the delivery of ISTAR capability, underpinning the delivery of vital reference products to the war fighter. They play an integral part of any deployed Brigade, Battle Group or Operational Intelligence Support Group, and at the National Intelligence Exploitation Centre, RAF Brampton and the Defence Geographic Centre at Feltham. Current shortfalls across the trade have been exacerbated by a continuing demand for new posts. Current

³ They include: Linguists (Tri-Service), Image Analysts (Tri-Service and Civilian), Intelligence Analysts (RAF), Operator Military Intelligence (Army), Operations Support (Intelligence) (RAF), Royal Engineer (Geographic) (Army), Electronic Warfare System Operator (Army), Unmanned Aerial Vehicle Operator (Army), Weapon Locating Radar Detachment Commander (Army), REME Technician Aircraft (Army), REME Technician Avionics (Army), Operations Support (Aerospace Battle Manager) (RAF), Aerospace Systems Manager (RAF), RAF Trade Group 1 (engineering personnel) and Royal Navy communications technicians and electronic warfare ratings. In addition, specialisms such as Human Intelligence Operators (Army) and Interrogators (Tri-Service) contribute significantly to overall capability.

predicted shortfalls are being addressed through a series of in-place and planned recruitment, training and retention initiatives which are beginning to have an effect. These measures should limit the number of trained and experienced personnel leaving the service and on this basis full Manning is forecast by 2013.

11. In other areas the level of shortfall causes concern and is being addressed but the issues are being managed and do not give rise to such significant concern in the context of current operations. The Royal Navy recognises that available technology (surveillance, communications, databases) has significantly changed the demands of Maritime ISTAR and is currently reviewing the detailed requirement for numbers and training of Royal Navy Intelligence Specialists to meet current and future demand. This review is due to be reported to the Navy Board later this year.

12. In general, the effect on the delivery of ISTAR capability on current operations continues to be containable and the effects of Manning shortages on operations continue to be managed through, for example, deploying some personnel more frequently than recommended by harmony guidelines. Work continues to recruit more people into these trade areas whilst retaining more of the existing, experienced personnel already working in these areas. There are also a number of systematic initiatives in place or planned to address current and future ISTAR capability personnel requirements. These include:

- Revised career structures, improved training and financial incentives for specialists.
- Updated recruitment strategies and increased internal transfers from other trade areas.
- Reorganisation and redistribution of existing personnel.

What are the main barriers to achieving the full potential of ISTAR? What action is the MoD taking to overcome these barriers?

- *What is the Department doing to ensure that processing and dissemination aspects of the ISTAR chain are effective?*

13. The perennial challenge for ISTAR is the delivery of timely, battle-winning information and intelligence (I2) to commanders on operations. For example, in conventional warfare such information allows our commanders to take decisions faster than an adversary can react. This is known as getting inside an adversary's decision cycle and the aim is to achieve such penetration at all levels. Ultimately, an adversary whose decision cycle has been comprehensively overtaken in this way can be rendered ineffective militarily and defeated without necessarily having his forces damaged significantly. This model does not read across directly to current operations but the ISTAR challenge is fundamentally the same. The main obstacles to achieving the full potential of ISTAR as currently perceived include: lack of bandwidth, limited interoperability of the various intelligence networks, lack of common standards for managing information, the challenge of information assurance including security accreditation and the availability of specialist personnel. The direct ISTAR technology issues are being addressed through both the core Equipment Plan (EP) and the delivery of Urgent Operational Requirements (UORs). This approach ensures that we recognise the immediate and specific needs of current operations while maintaining a coordinated ISTAR EP element which builds on operational experience. This forms part of a comprehensive approach that is underpinned by the delivery of a supporting wider communications infrastructure, principally the Defence Information Infrastructure (DII).

14. The full potential of ISTAR is realised through all parts of the Direct, Collect, Process and Disseminate (DCPD) parts of the ISTAR cycle. The delivery of recent UOR and EP capabilities has addressed the provision of more collection assets, although the constant evolution of operations means that there has been no let up in demand for collection assets (such as persistent Full Motion Video (FMV) and SIGINT). For example, reducing the numbers of personnel on the ground to reduce risk requires disproportionate increases in ISTAR collect capabilities.

15. The Direct, Process and Disseminate elements of ISTAR are being addressed through three core capability themes: Information Integration, ISTAR Management and Information Exploitation. These themes ensure that UOR and EP projects and programmes are aligned. The near term focus is on the delivery, under UOR arrangements, of the Intelligence Processing Application (IPA), a database for the exploitation of intelligence material by specialist analytical personnel and other capabilities including one to provide archive, retrieval and common access to all UK collected imagery in theatre. These are early examples of the DPD Virtual Knowledge Base concept⁴ and are informing, and consistent with, longer term deliverables under Project DABINETT. DABINETT seeks to improve tasking, make more efficient use of resources and develop a more dynamic approach to information exploitation and analysis including reach-back to the UK.

16. Collaboration with Other Government Departments (OGDs), Allies and Coalition partners at Secret and Top Secret level is key to leveraging the range of capabilities available, improving the ISTAR process and enabling the UK to fuse intelligence more effectively. The overall approach is to exploit modern

⁴ The Virtual Knowledge Base (VKB) concept connects multiple, disparate sources of existing intelligence and information across multiple security levels.

techniques such as web-based ways of working, real time chat-rooms and virtual real time collaborative working spaces. In this respect, and in view of the general importance of the relationship with the US, keeping in step with US-led initiatives is a high priority. In parallel, pilot programmes to improve further intelligence collaboration between the MOD and UK intelligence agencies are being initiated. Underpinning these developments, the UK is moving towards an approach in which risk to security of information is balanced against the advantages of sharing; such an approach requires significant business process and cultural change as well as training. Delivering a robust access control mechanism⁵ which is agreed across the UK intelligence community and with Allies will be a key enabler to ensure continued access to the intelligence capabilities of Allies and OGDs. All this work is informing the design of Defence's future intelligence fusion capability.

17. The Department is pursuing a portfolio of mutually supporting projects which will improve the technical ability to collaborate with Allies and OGDs. These include projects to provide core applications and services for handling Top Secret material shared with Allies as well as improving connectivity with UK OGDs (eg the Collaboration in the Intelligence Community (CLiC) initiative). Progress is closely linked to wider programmes, in particular DII, and to tackling some of the issues mentioned above such as security accreditation.

To what extent are existing ISTAR systems and capabilities interoperable with coalition forces?

18. ISTAR interoperability describes the ability of UK Armed Forces and coalition forces to train, exercise and operate effectively together in the execution of assigned missions and tasks. Departmental guidance identifies three levels of ISTAR interoperability:

Level 1—Integrated

ISTAR capabilities should be able to merge seamlessly allowing the interchange of ISTAR system elements. Integrated interoperability is likely to occur at the strategic ISTAR “touch points” between nations.

Level 2—Compatible

UK ISTAR capabilities should be able to interact with coalition forces allowing ISTAR systems to operate alongside each other within the same battle-space.

Level 3—De-conflicted

ISTAR capabilities should co-exist but not interact with ISTAR capabilities from other coalition nations, due to equipment or procedural incompatibility.

19. The level of interoperability achieved between coalition ISTAR capabilities is influenced by the level of security classification at which the capabilities exchange voice, data and imagery. Another factor is the differing standards employed by coalition ISTAR systems. The following paragraphs illustrate UK capability and the level of interoperability achieved within the coalition:

— Manned Airborne Surveillance

Defence provides a range of fixed and rotary wing capabilities which deliver Electronic Warfare (EW) and imagery ISTAR in addition to the ability to identify moving and stationary ground threats. Manned Airborne Surveillance is compatible with coalition forces and relies upon its onboard communications for the transmission of voice, data and imagery intelligence to UK and coalition forces in near-real-time.

— Unmanned Airborne Surveillance

Operational and Tactical UAVs provide a FMV capability which can be down linked directly to tactical troops. Operational UAV capability is fully integrated with US capabilities through the exchange of voice, data and imagery; the tactical systems are compatible with wider coalition UAVs.

— Land Surveillance

Land ISTAR surveillance includes EW and Base Protection Surveillance capabilities.

— EW sensors achieve compatible interoperability through the exchange of voice and data with US airborne surveillance systems and coalition fast jets.

— Base Protection surveillance is delivered through a mix of sensors which are compatible with coalition capabilities.

— Maritime Surveillance

Defence maritime electronic surveillance capability is compatible with coalition ISTAR systems.

⁵ Public Key Infrastructure (PKI)—an approach to managing identities electronically across and within computer networks. This allows easier sharing of information between trusted partners. The necessary policy and technical solutions are being addressed.

20. The Department is fully engaged in improving the Coalition ISTAR interoperability through a number of complementary initiatives. The UK contributes ISTAR voice, data and imagery on a reciprocal basis with other NATO and coalition nations:

— NATO/ISAF initiative

The UK is providing Operational UAV FMV to NATO which is then available over both the NATO and ISAF networks as part of an integrated imagery capability for Afghanistan.

— UK Initiatives

Under UOR arrangements, the UK is fielding a system to deliver integrated imagery dissemination, storage and management capability to UK forces. This is also delivering interoperability with a multinational NATO-sponsored interoperability programme that performs a similar function for a group of key Coalition nations.

What lessons can be drawn from current operations for developing future capabilities?

21. The main general lesson for future ISTAR capability from operations in Afghanistan and Iraq is that UK forces should expect future counter insurgency and stabilisation and development type operations:

- (a) to be conducted at distance in environments where the terrain and the interaction between protagonists and the local population pose significant challenges to operation planning and conduct;
- (b) to involve an enemy that is very agile (both physically and in the techniques they employ), increasingly “ISTAR aware” and able to change its *modus operandi* rapidly in an attempt to circumvent our ability to detect, track and recognise them;
- (c) to require constant improvements to ISTAR capability and reliance on agile UOR arrangements (which have proved successful in responding dynamically to changes in requirement).

22. Current strategic and tactical ISTAR capability underpins operational planning and intelligence preparation in advance of all operations, and the procedures for this are well established. Experience from current operations suggests that the equivalent processes for preparing UK forces to understand the cultural environment in which they will operate are less well developed. For counter insurgency and stabilisation and development operations UK forces need to have a better understanding of the culture of and influences on both insurgents and the wider civilian population. Gaining support of the civilian population is critical to strategic success and the lack of understanding of the cultural environment has been demonstrated to result in the significance of individual pieces of intelligence derived from ISTAR being missed, overstated or misinterpreted. The consequences for planning and conduct of operations can be significant and increase the likelihood of attempts to influence the local population going awry. Improvement to the collection, processing and dissemination of intelligence is important, but the significance of the intelligence needs to be understood. This will require access to sufficient bandwidth, secure communications infrastructure linked to coalition forces and specialist personnel. In counter insurgency and stabilisation and development operations, the operational drivers are different from conventional warfare and may place different or additional demands on ISTAR and supporting infrastructure.

23. ISTAR platforms and sensors in Afghanistan and Iraq have been effective in capturing large amounts of intelligence in the predominantly dry and dusty environment outside urban areas in these countries. Some sensors are less effective at the timely identification and accurate locating of insurgents in complex urban environments or under cover of dense vegetation, in and around buildings or underground. ISTAR UORs and systems delivered by the Defence programme have improved capability against targets in these complex environments. Future operations in environments of dense vegetation or large urban areas may require a different mix of ISTAR sensors to optimise intelligence gathering and target identification.

24. However, the requirement remains for ISTAR capabilities to be flexible enough to fight a war and not **the** war. This is likely to be achieved by reducing dependence on separate manned and unmanned platforms with dedicated sensors and exploitation centres and using fewer platforms with sufficient range and payload to carry an adaptable mix of sensors with sufficient communications links to theatre and UK-based exploitation centres to allow the rapid analysis and fusion of all-source intelligence. Convergence of sensor fits will be enabled by the development of a modular ISTAR architecture and an increasing reliance on common interface and data format standards. The DABINETT Deep & Persistent programme plans to provide platforms “fitted for but not with” a suite of “plug & play” sensors optimised for the ISTAR requirements of the operation and specific missions.

25. The associated ISTAR research programme aims to allow the identification of new sensor and data processing technologies that can be quickly integrated into the modular ISTAR architecture to allow rapid technology insertion and upgrades to meet changing operational demands. The Persistent WAS research programme seeks to demonstrate the benefits of placing multiple sensors onto a single platform and of on-board fusion of the data to improve identification of difficult targets in complex environments.

26. Improving ISTAR capability in response to lessons identified on current operations cannot be achieved by focussing on technical improvements and responsiveness alone. The need for sufficient skilled personnel such as linguists, imagery analysis and intelligence specialists has been noted but there is a parallel

requirement to broaden the skills of specialists and for improved pre-deployment training of ISTAR specialists to ensure that they can exploit the new analysis tools and techniques being developed in response to current operational challenges.

6 July 2009

Supplementary memorandum from the Ministry of Defence

KEY SYSTEMS ADVISOR (KSA)

The Committee sought information about the role and work of the Key Systems Advisor initiative in terms of its impact on ISTAR capability

1. The Defence Technology Strategy recognised that Defence functions through many complex systems which depend on each other and that the risks of this “system of systems” not working well together should be accepted and managed by Defence. Accordingly, it identified the need for independent advice and the adoption of Enterprise Planning techniques to deliver an MoD owned system of systems architecture. This would enable Defence to understand the system of systems risks and make plans to deal with them.

2. To this end, in March 2009 the Department appointed a Key Systems Advisor supported by a small staff. The KSA is accountable to the Deputy Chief of Defence Staff (Capability) in his role as Senior Responsible Owner for Network Enabled Capability. The KSA is responsible for driving significant improvements in the planning, design, development and deployment of networked capabilities by helping the Department to connect business, operational and technical activity across organisational boundaries. He works closely with the Department’s Chief Information Officer and the DE&S. He is working on three themes: Enterprise Planning to ensure that the Department understands how the organisation connects together at the highest level and that all components are working together; Business and Technical Integration to align operational/business and technical intent and so assist the creation of a system of systems architecture; and Enterprise Transformation through a package of predictable, repeatable and simplified governance and process that can be applied widely.

3. The KSA team has helped to improve coherence across all capability management strategies, especially those supporting C4⁶ and ISTAR and assisted in the drafting of higher level strategies. It has advised on the reorganisation of acquisition related governance structures and supported the formation of Through Life Capability Management Programme Boards. It has promoted network joining rules as the first step towards ensuring that new systems do what is intended and do not damage the network. KSA work to address interoperability and integration issues will contribute to more effective and efficient delivery of networked capabilities to current operations and for contingent capability.

MoD LINGUISTS

The Committee sought information about the number of MoD linguists who speak Pashtu in comparison to Arabic and what action the MoD is taking to address any shortfall in the number of linguists who speak the languages required for effective operations in Afghanistan

4. The key languages for operations in Afghanistan are Pashtu, Dari and Farsi. Currently, the Department has a requirement in theatre for 18–20 Pashtu speakers, six to eight Dari speakers (within a total complement of 26 posts), two Farsi speakers and one Arabic speaker.⁷ There is also a requirement for six Pashtu speaking and one Dari speaking cultural specialists which is expected to be met in 2010. There are in addition a number of MoD linguists employed in support of current operations who are not based in theatre.

5. The MoD linguists required to support operations in Afghanistan are provided by selecting volunteers for *ab initio* language training and providing further training to personnel who have already deployed and wish to re-deploy as linguists. The requirement for linguists is kept under review as a matter of routine to define, refine and prioritise the requirement, both in terms of numbers and skill levels. At present six of the theatre posts cannot be filled by personnel with the desired level of language skills. This is mainly due to the difficulty of the languages and the training challenges. Pashtu, in particular, is a highly complex language with no standardised form and many dialects which may be virtually incomprehensible to each other. There are few developed teaching materials, although training methodologies and materials are evolving, and difficulties in providing suitable teachers. These factors complicate training design and delivery and the expansion of Defence operational language capability. Countervailing work includes encouraging suitable volunteers (for example financial award schemes are either in place or are being developed to encourage suitable volunteers to train for linguist duties and to maintain their proficiency), improving the capacity and standard of training delivery and rigorously prioritising requirements to minimise shortfall impacts.

6. As well as specialist linguists in theatre, each brigade that deploys has access to training for up to 64 of its personnel as basic Pashtu or Dari speakers.⁸ The numbers of linguists trained by each brigade varies according to the perceived operational requirement. Most training places are now taken up although a

⁶ Command, Control, Communications and Computers.

⁷ These may be Professional or Expert level speakers, the two highest categories.

⁸ These will be at the Survival and Functional levels, the two lowest categories.

minority reach the required level of language skill. In addition, all military personnel deploying to Afghanistan receive training from native speakers in very basic phrases, word and responses and are issued with an *aide memoire*. In the last year about 14,000 personnel have received this very basic training.

7. Around 400 Afghan nationals are also employed in Afghanistan as locally employed civilian linguists. It is difficult, however, to find volunteers who speak the Helmand dialects of Pashtu, as well as sufficiently good English. Finally, civilian contractors, including British Afghans, are employed in the three following roles in support of UK forces in Afghanistan:

- Personnel contracted to deploy as linguists in support of various activities in theatre.
- Personnel contracted through language service providers to deliver Defence operational language training in UK.
- Personnel contracted through language service providers to deliver pre-deployment language training to deploying Brigades in UK.

13 July 2009
