



House of Commons  
Committee of Public Accounts

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**Ministry of Defence:  
Delivering digital tactical  
communications through  
the Bowman CIP  
Programme**

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**Fourteenth Report of  
Session 2006–07**

*Report, together with formal minutes, oral and  
written evidence*

*Ordered by The House of Commons  
to be printed 27 February 2007*

**HC 358**  
**[Incorporating HC 1708-i, Session 2005-06]**  
Published on 8 March 2007  
by authority of the House of Commons  
London: The Stationery Office Limited  
£0.00

## The Committee of Public Accounts

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## Summary

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The Bowman family of digital radios, and the associated Combat Infrastructure Platform (CIP), are key to the plans of the Ministry of Defence (the Department), to transform military communications and enable the Armed Forces to operate more effectively and at a quicker pace. The pressing need to replace the ageing Clansman radios used since the 1970s with reliable, secure voice communications has made Bowman one of the Army's top priorities.

By enabling transmission of large quantities of electronic data Bowman is intended to provide information on the position of UK forces, and forms the underlying network to carry CIP. CIP is intended to replace and automate many existing manual processes for command and control on the battlefield. It is also key to plans for "Network Enabled Capability"; joining up military communications and electronic systems in a "network of networks". The ability to see the position of UK forces, on screens in vehicles and headquarters, should amongst other benefits, help to avoid "friendly fire" incidents.

The programme involves conversion of up to 15,700 land vehicles, 141 naval vessels, and 60 helicopters, with training for some 75,000 service personnel. Contracts worth £2.4 billion were placed with General Dynamics UK, in 2001 for Bowman and in 2002 for CIP.

The secure radio capability provided by Bowman has only recently begun to enter service, some ten years later than originally intended, resulting in the armed forces having to operate with insecure, out-dated analogue radios for far longer than they should have done. Though Bowman was declared in service in March 2004 and useful new capabilities have since been delivered, conversion of vehicles and units has been slow, and troops do not find the equipment flexible and intuitive to use.

Substantial technical challenges remain to be overcome before all the required capabilities are in place. Bowman CIP was accepted into service in March 2004 with 27 major provisos that reduce the operational capability of the system. An increase in funding of £121 million has been required to enable this phase to be completed. Furthermore, several important capabilities have also been removed from the system to enable the remainder to be delivered in 2007-2008; deletions include key requirements such as the ability to communicate data directly with allies' systems, which, again, should have helped reduce the risk of friendly fire incidents.

Bowman CIP is a complex and technically demanding programme and the Department seriously under-estimated the challenges involved in both delivering it and sustaining it in service. The failure to adequately survey the state of the army's vehicle fleet led to difficulties in conversion, which further increased the delays in bringing the system into service. Support costs such as provision of spares and training requirements were also severely under-estimated. In some areas, most notably the radio provided for the dismounted infantry, the equipment delivered failed to meet the requirements of the users even though it met the requirement in the contract. Management failings did not help. The Department failed to appoint from the outset a Senior Responsible Officer (SRO) with the

responsibility, funding and authority to deliver the programme.

On the basis of a Report from the Comptroller and Auditor General<sup>1</sup> the Committee took evidence from the Accounting Officer and supporting witnesses on four main issues: the overall control and management of the Bowman CIP procurement programme; the realism of the initial business case; the adequacy of planning estimates of through life costs; and the prospects for Bowman CIP delivering the full operational requirement.

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<sup>1</sup> C&AG's Report, Ministry of Defence: *Delivering digital tactical communications through the Bowman CIP programme*, HC (2005–06) 1050

## Conclusions and Recommendations

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- 1. There is no individual within the Department with full responsibility for ensuring that the Bowman CIP project meets its objectives.** In 2006, the Department belatedly appointed a senior officer to act as Senior Responsible Owner. But he lacks the authority and time to effectively discharge this onerous responsibility and is only supported by a small staff. In applying the Senior Responsible Owner concept, the Department should equip those appointed to such challenging positions with the funding, authority and trust to fully discharge their responsibilities in line with the guidance issued by the Office of Government Commerce.
- 2. The Department took nine months to approve the revised deal struck with General Dynamics UK in October 2005.** Time is money for the Department and its contractors, and delaying delivery of a much needed capability could also cost lives. The Department intends to action the relevant recommendations from its Enabling Acquisition Change review to improve its in-house approvals processes. The Department should also engage the Treasury and other relevant government departments in developing a leaner, more responsive approval process so that decisions can be made in a more timely manner.
- 3. The Bowman CIP project timescale was clearly unrealistic, and the inherent complexity and technological challenges were under-estimated.** The Department should re-design its scrutiny processes and better align these and its assurance processes so that they are fit to deal with the challenges of modern defence acquisitions and to take into account the culture of over-optimism endemic in much defence procurement.
- 4. The vehicle conversion challenge posed by the unexpected variation in the land vehicle fleet could have been predicted if the fleet had been properly surveyed before contracts were placed.** The problem was compounded by the absence of good data on vehicle configurations, and the practice, particularly in the army, of modifying vehicles without managing and tracking the modifications. Until the Department obtains adequate standing information on vehicle condition and configuration, it should re-emphasise to Users the importance of maintaining standard configurations wherever possible and should survey representative samples of vehicles before commencing modification work.
- 5. Complex new systems such as Bowman CIP are more expensive to support and will require more on-going training than their simpler predecessors.** To encourage more serious consideration of Through Life Management issues and better inform future investment decisions, the Department should validate the quality of the key data underpinning decisions on the delivery of through life management capability including measures of financial maturity, and clarity about the capability needed.

6. **Bowman CIP was accepted in service in March 2004 with 27 major provisos that reflect the limited operational capability of the initial system.** The Department should only accept that General Dynamics UK has cleared the provisos on the basis of robust trials-based evidence and should not pay any outstanding amounts until it is satisfied that the Armed Services are getting the capability they asked for.
7. **The Department has removed several important capabilities from the existing Bowman CIP programme.** The Department has developed plans which it is confident will now deliver the most vital aspects of capability without further delay. The capabilities being delayed, such as the ability to communicate with allies, remain important, not least to reduce the risk of further friendly fire deaths. The Department is confident that, to date, no lives have been lost due to this deferral. It should, within the next year, develop a realistic forward plan to ensure the Armed Forces do not have to forego these capabilities for longer than is absolutely necessary.
8. **In addition to the timescale slippage, the Department has agreed to pay a further £121 million to General Dynamics UK to deliver Bowman CIP, despite a much reduced number of platforms to be converted, and some aspects of the requirement being shuffled to another project.** Securing value for money in the long-term will require the Department and General Dynamics UK to work together collaboratively to cost-effectively deliver and sustain the capability required by the Armed Forces. To support this objective, the Department and General Dynamics should regularly assess the strength of their relationship.



# 1 Programme governance arrangements were not fit for purpose

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1. The Bowman family of digital radios, and the associated Combat Infrastructure Platform (CIP), are central to the Department's plans to transform military communications and enable the Armed Forces to operate more effectively and at a quicker pace. The pressing need to replace the ageing analogue Clansman radios used since the 1970s with secure, reliable voice communications has been championed by operational commanders since the mid-1980s and has made Bowman one of the Army's top priorities. By enabling transmission of large quantities of electronic data Bowman is intended to provide information on the position of UK forces, and forms the underlying network to carry CIP. CIP is intended to replace and automate many existing manual processes for command and control on the battlefield. It is also key to plans for "Network Enabled Capability"; joining up military communications and electronic systems in a "network of networks". The ability to see the position of UK forces, on screens in vehicles and headquarters, can contribute to avoidance of "friendly fire" incidents.<sup>2</sup>

2. The combined Bowman and CIP is a wide ranging programme, with consequences across the Department and the three armed services. For example the installation of Bowman CIP across the land vehicle fleet is regarded by the Army as equivalent to a medium scale military operation.<sup>3</sup> The total programme involved many different parties, and the complex inter-relationships between stakeholders in the Department, the Armed Forces and Industry required programme management arrangements able to cope with complexity and change.<sup>4</sup>

## Delays in the programme

3. Despite the benefits to be gained from the system, the development of Bowman has suffered serious delays. A mixture of technical and industrial difficulties and budgetary constraints led to postponements of the original 1995 In Service Date. In 1995 our predecessors expressed concern<sup>5</sup> that United Kingdom forces in Kosovo had to rely on radios that were vulnerable to enemy interception. They urged the Department to make all possible efforts to bring Bowman into service without further delay. Between 1995 and 2000 the Department pursued a non-competitive solution with the Archer Consortium,<sup>6</sup> finally losing confidence in that supplier's ability to deliver a system that met its requirements in the required timeframe and which offered value for money. In September 2001 it awarded a replacement contract to General Dynamics UK, maintaining the same

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2 C&AG's Report, paras 1, 1.2–1.7

3 Depending on the nature of the operation, a medium scale operation on land is defined as brigade-sized (some 3,000 to 5,000 personnel)

4 C&AG's Report, paras 2.2–2.4

5 Committee of Public Accounts, Forty-fourth Report of Session 1994–95, *Ministry of Defence: Major Projects Report 1994*, HC 487

6 Comprising BAE Systems, Racal and ITT

March 2004 In Service Date as previously set for the Archer Consortium. Bowman was duly accepted in service, albeit with 27 major provisos and a number of capabilities removed from the specification, in March 2004. The armed forces are now part way through a lengthy period of conversion to Bowman and CIP. The delays since 1995 have resulted in our troops continuing to use out-dated and insecure communications, latterly at periods during current operations in Iraq and Afghanistan.<sup>7</sup>

4. It was recognised from the late 1980s that Clansman needed replacement, and the Department accepts that it would have been much better if it had been replaced more quickly. Bowman CIP was a challenging and technically demanding programme but some of the delays incurred were avoidable. The Department now accepts that the appointment of the Archer Consortium was a mistake because the consortium was unable to deliver the required product. The decision to appoint the Archer Consortium had been taken 10 years ago by an internal board of the Department, and the passage of time and changes in personnel may result in a failure to learn from mistakes. The Department believes, however, that appropriate lessons have been learned.<sup>8</sup>

5. In October 2005 the Department concluded negotiations with General Dynamics UK to agree a recast programme, on the basis of a further £121 million of additional funding and a two year extension to the timescale for delivery of a fully operational system. But it then took the Department a further nine months, until July 2006, to get approval for this new way forward. This time was consumed by discussions within the Department prior to approval by its Investment Approvals Board, followed by discussions with the Treasury because the adjustment required their approval. The Department recognises that its decision-making processes are more complicated than they need to be and is looking at its internal approvals process to slim down the number of layers of consideration, whilst retaining the due diligence that is needed to spend taxpayers' money sensibly.<sup>9</sup>

## The appointment of a Senior Responsible Owner

6. In 2003 the Office of Government Commerce (OGC)<sup>10</sup> emphasized a number of key features of good programme management to ensure co-ordination of projects and their inter-dependencies in pursuit of agreed goals. One key aspect of the guidance is the appointment of a Senior Responsible Owner (SRO) who is ultimately accountable for delivering the programme successfully. The OGC guidance also advised establishing a Programme Office to ensure that the programme proceeded coherently.<sup>11</sup> Key aspects of the OGC guidance are summarised in **Figure 1**.

7. In February 2002, prior to the OGC Guidance, the Department appointed the Assistant Chief of the General Staff as “the focus for oversight of the introduction of Bowman.” He co-ordinated the various activities that needed to happen, but although widely assumed to be the SRO, he had neither funding nor the management authority necessary to fulfil the

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7 C&AG's Report, para 1.4

8 Qq 30–31, 64

9 Qq 23, 33, 35

10 *Managing Successful Programmes*, Office of Government Commerce, 2003

11 C&AG's Report, para 2.6

role. In mid-2006 the Department appointed the Capability Manager (Information Superiority) as SRO for all aspects of network-enabled capability, which includes Bowman CIP. With this appointment, the Department considers that it has significantly clarified the situation regarding high level governance, and that it has learned lessons. Whilst not specifically designated as SRO for Bowman itself, the SRO oversees all defence programmes including Bowman. Within the SRO's team, a Director of Equipment Capability, supported by a small staff in the programme office, is the single point of accountability for Bowman.<sup>12</sup>

8. The Department acknowledges the shortcomings in the way Bowman CIP has been managed and agrees that the handling of the programme would have been better had there been an identified SRO in place earlier in the programme. One factor was confusion about whether the SRO role should lie with the central equipment sponsor of the equipment programme, or the eventual equipment user. The Department now believes that, given its organisational and budgetary structures, the central sponsor is best placed to fulfil the role.<sup>13</sup>

9. Looking beyond this programme to the implications for Defence procurement generally, the Department accepts the OGC guidelines, but considers that these are not straightforward to implement consistently in the MOD because it has so many projects. It recognises that it needs a clear picture of who owns which risks, while ensuring that risk-owners are identified. The Department intends to routinely appoint SROs in future who are manifestly and obviously in charge, sufficiently senior to carry authority, and who are well placed in the Department with a good view of the various strands of activity that need to be brought together. The SRO will need to be supported by an integrated project team and have the trust of and lines of communication with people, both inside the Department and principal contractors. These principles are set out in the Department's procedures, but, as Bowman shows, are not consistently applied.<sup>14</sup>

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12 Qq 4, 69, 134

13 Qq 36, 41

14 Qq 36, 135, 156–157

**Figure 1: Responsibilities of an SRO**

The SRO is the individual responsible for ensuring that a project or programme of change meets its objectives and delivers the projected benefits. The SRO should be the owner of the overall business change that is being supported by the project; and should perform the following functions:

- ensure that a project or programme of change meets its objectives and delivers the projected benefits;
- ensuring that the project is subject to review at appropriate stages;
- own the project or programme brief or business case;
- development of the project or programme organisation structure and logical plans;
- monitoring and control of progress;
- formal project closure;
- post implementation review;
- problem resolution and referral.

In carrying out the role, an SRO must be someone who can:

- take responsibility;
- have a good understanding of the business issues associated with a project;
- be a senior reputable figure approved by the Department Board;
- be active;
- have sufficient experience and training to carry out SRO responsibilities;
- be able to broker relationships with stakeholders;
- deploy delegated authority;
- provide advice and guidance to project managers;
- acknowledge their own skill / knowledge gaps and structure the project board and project management team accordingly;
- give the time required to perform the role effectively;
- negotiate well and influence people;
- be aware of the broader perspective and how it affects the project;
- network effectively;
- be honest and frank about project plans.

*Source: Office of Government Commerce*

## 2 Initial decisions were not well informed to reduce later risk

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10. A procurement project has greatest chance of success if sufficient funds are well-invested early in the process to understand the technology and consequently reduce or eliminate risk. The Bowman CIP programme was a large, technically demanding undertaking, part of which involved advanced technology, and the Department seriously under-estimated the technical challenges and the resources and time that would be needed to deliver it. And more could have been done to ensure that it met the aspirations of users.<sup>15</sup>

### Over-optimism of the programme

11. The Department accepts that, in devising the original Bowman programme and at various subsequent stages, the challenges, particularly the technical ones, were underestimated. There was a degree of over-optimism at various stages in the programme planning and the Department only realised the full implications as suppliers began working on it.<sup>16</sup>

12. Technical capability has changed significantly in the outside world during the life of the programme. In 2005 it became necessary for the Department to take stock of the implications and to re-assess what it could deliver in an acceptable form and which of the various capabilities needed to be re-examined more carefully. The Department believes that for projects such as Bowman CIP it is procuring capability without being able to predict in advance the exact product that would emerge after a period of development. Significant changes therefore occur during the life of programmes, so it is essential that the Department has in place management practices that allow them to make necessary adjustments to optimise the capability ultimately achieved.<sup>17</sup>

13. When the Department decided to replace the earlier Archer Consortium with General Dynamics UK it retained the In Service Date of March 2004 that had been agreed with Archer, thereby giving the contractor only 30 months for delivery. It subsequently awarded the contract for the CIP element of the programme in December 2002 with an In Service Date of December 2004. These were exceptionally demanding targets which raised users' expectations of getting the full operational capability by those dates. The Department now recognises that the targets, particularly for the CIP element of the programme, were over-ambitious. The radio element of the programme was in fact accepted in service in March 2004, but with 27 provisos that limit the operational benefits derived from the system.<sup>18</sup>

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15 Q 2

16 Qq 62, 156

17 Qq 24, 32, 47

18 Q 101

14. The development of CIP remains at a very early stage, with a good deal of development still to be done. It would have been possible to get a secure radio into service earlier had the CIP element not been included in the programme. But the Department believes that the Army's entire vehicle fleet would then have needed to be taken out of service twice: once to fit the radio and then again to fit whatever additional equipment was needed for CIP. Additional costs would inevitably have resulted, and the Department is convinced that it adopted the right approach in seeking to get a significant degree of CIP functionality delivered within the same timeframe as the secure radio.<sup>19</sup>

### **Predictable conversion difficulties were under-estimated**

15. Alongside development of the Bowman CIP equipment, the contractor faced a major task in converting up to 20,000 land vehicles, as well as various naval platforms and helicopters, to carry the system. Poor data on the exact configuration of vehicles meant that conversion was both slower than anticipated and more expensive. Though it was well-known that there was a culture within the Army of modifying vehicles in service, the Department decided against a full survey and instead chose to rely on a small sample of "representative vehicles" on which the contractor would base its estimates of time needed to install the system. This proved to be a wholly unsatisfactory basis for planning the conversion programme. The Department now realises that the fleet of vehicles varied more than it had expected, some being variations that had been built in at the time of manufacture and some of which were built in over time. With hindsight the Department acknowledged that it ought to have undertaken a larger survey of vehicles. The contractor has now improved the conversion rate being achieved to a peak of 84 a week, and fewer than 6,000 vehicles remain to be converted. On this basis the Department estimates that the conversion programme will be completed by the end of 2007, though with so many forces on operations there is always a risk of slippage.<sup>20</sup>

16. The Department intends to gain a much better understanding of the configuration of vehicles in future as it adds further complex digital systems to its platforms. Besides the new JAMES2 database which will define what is standard in each vehicle, the Bowman programme includes a system that will record what radio is fitted and with what standard of software. This information will be essential in planning future incremental upgrades of Bowman. But more fundamentally, it hopes that modern manufacturing techniques and improved configuration control will mean that, in future, the fleet of vehicles will not vary as much as this one did.<sup>21</sup>

### **User requirements were not fully considered**

17. It is essential in any programme, but particularly important with a programme of the magnitude of Bowman CIP, that the end product delivered meets the requirements of the end users. One of the lessons learned from the Bowman programme is that the Department did not do enough to take on board the real requirements of the Armed

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19 Qq 86–89

20 C&AG's Report, paras 3.16–3.20; Qq 11, 73

21 Qq 10–11, 151

Services. In the case of the radio provided for dismounted infantry, since the late 1990s successive Army Directors of Infantry had stressed that any increase in size or weight of the radio would be unacceptable. The Integrated Project Team did not, however, obtain Director of Infantry's acceptance of the size, ergonomics and weight of the Bowman radio and the radio finally produced fails to meet the Army's requirements for use by dismounted soldiers. The weight requirement was balanced against the radio performance required since it was clear by the time the contract was let that the contractor could not achieve both criteria. The Department chose to give priority to the performance criteria and so the radio produced, along with associated equipment including batteries, aerials, carrying equipment, user terminal and display, proved too heavy for the dismounted infantry, even though the contractor had met the contract requirement. A separate stream of work is now to be put in place to develop something light enough to use and fit for purpose.<sup>22</sup>

18. The size and weight of the Section Radio is crucial to the infantry, since a bigger, heavier device means soldiers are able to carry less other equipment and ammunition. The Department said that it had decided to deploy the Bowman Section Radio in the form it had been developed to provide the benefits to as many users as possible and then to set in hand a separate stream of work to develop something that will be light enough to meet the infantry's needs. The Department believed this option was better than denying all users the benefits of the radio whilst a smaller version was developed for dismounted infantry.<sup>23</sup>

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22 Qq 16–17, 19–20, 48, 144

23 Q 144

## 3 Through life costs were not rigorously assessed

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19. Successful procurement involves planning and managing projects on a through-life basis, covering feasibility, research, development, production, bringing into service, maintenance, and eventually disposing of equipment. Bowman is a complex system designed to provide a wide range of equipment and functionality and consequently requires an extensive range of support services for maximum benefit to be derived from the system. The Department failed to plan adequately for the full range of costs associated with introducing Bowman.<sup>24</sup>

20. When the programme was approved the Department's expectation was that support costs would be broadly in line with the equivalent costs for Clansman. But the Bowman CIP system comprises between two and three times as many major components as the Clansman radio that preceded it. It is difficult to get an accurate assessment of support costs for new equipment until it is brought into service, and some support costs associated with Bowman were initially under-estimated. Support costs have also increased as equipment is deployed on operations in difficult conditions such as those experienced in Iraq. For the longer-term, the Department is looking at a built-in through life support system for Bowman CIP consistent with the partnerships envisaged in the Defence Industrial Strategy.<sup>25</sup>

21. The Department's assumption that training costs should be no higher than those for using Clansman was clearly unrealistic. The training requirement to ensure that users make use of all the capabilities of the Bowman system will be significantly higher than the equivalent for the much simpler Clansman radio. Training costs were not fully assessed in the early stages. In particular, Bowman requires not just initial training but also regular continuation training. It is also an evolving system and, as new capabilities are added, further training is needed.<sup>26</sup> The Department acknowledges that the training budget was well short of what was needed and agrees that in future it makes sense to think in terms of acquiring not just a radio system but a radio system with through-life support built in.

22. In December 2004 it became clear to all parties that the Bowman CIP programme was over- ambitious and needed substantial revision. The Bowman radio accepted into service was subject to ongoing provisos and CIP failed to meet its expected In Service Date. Following a detailed review and negotiations between the Department and the contractor a recast programme was agreed resulting in a further £121 million of funding and a two year extension in the timescale. The Department and General Dynamics UK have different views on how much of the £121 million represents new or changed customer requirements and how much represents cost increases in delivering the capability originally contracted

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24 Q 156

25 Qq 50–51, 114–115; C&AG's Report, para 3.13

26 Qq 7–8, 43, 82



for. The Department described it as “regrettable additional expenditure”. The Department’s view is that the basic capability requirement is unchanged but that changes in the means of meeting it had to be made in order to deliver the programme.<sup>27</sup>

23. Overall the cost overrun equates to 5% of the initial programme cost, although on a unit cost basis the overrun is clearly larger because the scale of the Bowman CIP programme has been reduced. This outturn cost equates to an average £52,000 per radio installation.<sup>28</sup> If the additional £200 million estimate for the cost of deleted capabilities (paragraph 32), proves correct this would be a further 8% overrun on the original programme cost.<sup>29</sup>

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27 Q 46

28 Ev 21

29 Q 83

## 4 Operational benefits are limited by reductions in the programme

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24. Bowman was accepted into service in March 2004, though with 27 major provisos that limit the operational capability of the system. It has been used by the Army in Iraq and Afghanistan and has resulted in significant operational benefits, although experience has highlighted problems that still need to be resolved prior to the final acceptance of the system from the contractor. The recast programme planned to be completed in 2007 now excludes important original requirements, including the ability to share data with coalition partners and to handle the much greater quantities of information transmitted.

### Operational performance

25. The Department said that when Bowman CIP is being used by troops on operations it gives them options that they did not previously have. Communications take place much more quickly and effectively, and over relatively long ranges. In particular the Bowman radio is easier and speedier to use, in that there is no need to manually code messages. The ability to track troops and know where they are is a further important benefit.<sup>30</sup>

26. Bowman CIP is a complex system and it is important that troops are able to use it effectively. The basic training package provides a basic operator's understanding of how to work the system. However, specialist troops using the full range of services, such as the Royal Signals, receive a much greater degree of training. Many aspects of the Bowman system are not particularly intuitive, and the Department intends to work with the contractor to find ways to make it more so and easier to use.<sup>31</sup>

### Progress with introducing Bowman into service

27. The conversion of army vehicles and units has taken longer than initially forecast. At the time of our hearing just over half the army's vehicles had been converted with the interim version of Bowman CIP. The Department told us that currently fewer than 20 of the provisos affecting this version still apply. The current stage of the programme to remove the provisos, known as Bowman CIP 5, is expected to take well into 2007 to complete. There remains a risk that further delays may occur because the operational load on the Army may prevent them from conducting the large field trial necessary to demonstrate progress before Bowman CIP 5 can be accepted.<sup>32</sup>

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30 Qq 13–14

31 Qq 39–40, 43–44

32 Q 73

## Reductions in the scope of Bowman CIP

28. The Department decided to omit many of the more technically difficult capabilities of the original Bowman CIP requirement system from Bowman CIP 5, including the capability to handle increased quantities of data and to exchange this directly with allies' systems. Studies are underway to explore the possibility of reflecting these capabilities in a possible future Bowman CIP 6, but demonstrator work has shown that it should be technically possible to exchange data with United States' forces. Removal of these capabilities from the current Bowman CIP, together with the delays and provisos to Bowman CIP 5, have reduced the operational benefits.<sup>33</sup>

29. The number of platforms to be converted to Bowman CIP has been substantially reduced as the programme has developed, including 18% fewer land vehicles and 74% fewer helicopters. The decrease was due to changes to the fleet of helicopters that is to be supported in future. The failure to convert any parts of the RAF to date had, in the Department's view, not impacted on operations. A way has been found to allow certain troops on the ground to talk to Apache attack helicopters, at a cost of £25 million. The Department had concluded that it would be too difficult to install Bowman itself in Apache at present, but they had not dismissed this possibility for the future.<sup>34</sup>

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33 Ev 22

34 Qq 103–111

# Formal Minutes

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**TUESDAY 27 FEBRUARY 2007**

Mr Edward Leigh, in the Chair

Mr Richard Bacon  
Annette Brooke  
Mr David Curry  
Mr Philip Dunne  
Helen Goodman

Mr Sadiq Khan  
Mr Austin Mitchell  
Dr John Pugh  
Mr Don Touhig  
Mr Alan Williams

## **Draft Report**

Draft Report (Ministry of Defence: Delivering digital tactical communications through the Bowman CIP Programme), proposed by the Chairman, brought up and read.

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

Paragraphs 1 to 29 read and agreed to.

Conclusions and recommendations read and agreed to.

Summary read and agreed to.

*Resolved*, That the Report be the Fourteenth Report of the Committee to the House.

*Ordered*, That the Chairman 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.

[Adjourned until Wednesday 27 February at 3.30 pm.]

## Witnesses

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### Wednesday 1 November 2006

**Mr Bill Jeffrey CB**, Permanent Under Secretary of State for Defence, **Major General Bill Rollo CBE**, Assistant Chief of the General Staff, **Air Vice-Marshal Stuart Butler**, Capability Manager (Information Superiority), Ministry of Defence; and **Dr Iain Watson**, Operations Director for Information Superiority, Defence Procurement Agency

Ev 1

## List of written evidence

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| 1 | Ministry of Defence                     | Ev 20, Ev 21 |
| 2 | General Dynamics United Kingdom Limited | Ev 21        |

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Second Report	Improving literacy and numeracy in schools (Northern Ireland)	HC 108
Third Report	Collections Management in the National Museums and Galleries of Northern Ireland	HC 109
Fourth Report	Gas distribution networks: Ofgem's role in the sale, restructuring and future regulation	HC 110
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# Oral evidence

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## Taken before the Committee of Public Accounts

on Wednesday 1 November 2006

Members present:

Mr Edward Leigh, in the Chair

Mr Richard Bacon  
Mr Ian Davidson  
Mr Sadiq Khan  
Sarah McCarthy-Fry

Mr Austin Mitchell  
Mr Don Touhig  
Mr Alan Williams

**Sir John Bourn KCB**, Comptroller and Auditor General, and Mr Tim Banfield, Director National Audit Office, were in attendance and gave evidence.

**Mr Marius Gallaher**, Alternate Treasury Officer of Accounts, HM Treasury, was in attendance.

### REPORT BY THE COMPTROLLER AND AUDITOR GENERAL

#### DELIVERING DIGITAL TACTICAL COMMUNICATIONS THROUGH THE BOWMAN CIP PROGRAMME (HC1050)

*Witnesses:* **Mr Bill Jeffrey CB**, Permanent Under Secretary of State for Defence, **Major General Bill Rollo CBE**, Assistant Chief of the General Staff, **Air Vice-Marshal Stuart Butler**, Capability Manager (Information Superiority), Ministry of Defence; and **Dr Iain Watson**, Operations Director for Information Superiority, Defence Procurement Agency, gave evidence.

**Chairman:** Mr Touhig has an interest to declare.

**Mr Touhig:** General Dynamics are based in my constituency and I know them well. I think the Committee should know that.

**Q1 Chairman:** Good afternoon and welcome to the Committee of Public Accounts. Today we are considering the Comptroller and Auditor General's Report, *Delivering Digital Tactical Communications Through the Bowman CIP Programme*, and we welcome back Mr Jeffrey, who is the Permanent Under Secretary. Would you like to introduce your colleagues please.

**Mr Jeffrey:** Yes, Mr Chairman. I have with me Major General Bill Rollo, who is the Assistant Chief of General Staff who, from the user point of view of the Army, is the person who has most interest in this programme. I also have with me Air Vice-Marshal Stuart Butler who is the Capability Manager (Information Superiority) in the Department, who is, in essence, the sponsor and owner of this project, and Dr Iain Watson is the Operations Director for Information Superiority in the Defence Procurement Agency, who is providing that perspective, so I am grateful to the Committee for allowing me to have these colleagues with me because they cover the various parts of this project.

**Q2 Chairman:** Well, obviously these are fairly technical matters, Mr Jeffrey, and you have brought particularly distinguished, very senior officers, so you can pass any questions to them, if you wish, but I will address my questions to you and my colleagues will, but please pass questions on, if you wish. Could you please start by having a look at page 2 of the Comptroller and Auditor General's Report and

looking at figure 1 where you will see it lists the challenges of delivering Bowman CIP. Would it be fair to say that, when one considers the multiple challenges of delivering Bowman with CIP, really the programme was unrealistic from the start?

**Mr Jeffrey:** I think it would be fair to say that, in devising the programme at the start, the challenges, particularly the technical challenges, were probably underestimated. It is certainly the case that there was, and we have seen this in other programmes that this Committee has examined, a degree of over-optimism at various stages, but it is also the case that this was in substance very challenging and it was only as we got into it with our chosen suppliers that we began to get a full sense of the technical challenge that was there and to adapt and change as we went. We have certainly learnt many lessons from it. On the other side of the account, what I would say is that it seems to me, looking back on it, that there was at least one point, and probably two, when the Department was at a turning point and was willing to look quite hard at the programme and readjust its position.

**Q3 Chairman:** Well, we are here to learn lessons, not just to apportion blame, so I hope that you feel that it is going to be a positive process this afternoon and you can be quite open as to what went wrong and what lessons we can learn for the future because, you are right, it obviously was a very difficult and challenging programme to deliver, but we would like to discover how we can avoid some of these problems in the future. Surely one way, and I admit to always asking this question, is the role of the senior responsible owner which I am sure you think is a very important position. Why was it in this case

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**Mr Bill Jeffrey CB, Major General Bill Rollo CBE, Air Vice-Marshal Stuart Butler, Ministry of Defence and  
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that we did not have a full-time appointment with a full-time staff? Surely if we had had a senior responsible owner in your Department as a full-time appointment with a full-time staff, he or she might have got more of a grip on it?

**Mr Jeffrey:** Well, the first thing to say is that we do now have such a person because Air Vice-Marshal Butler is in effect a senior responsible owner for this programme and all aspects of network-enabled capability. I think it is fair to say, as the Report does—

**Q4 Chairman:** How long has he been the senior responsible owner and what staff does he have? Perhaps you can answer, how long have you been in post, what is the nature of your role, how many senior responsible owners have there been and how could we have done this better, do you think?

**Air Vice-Marshal Butler:** Well, I have been in post personally for around six months and during that time we have significantly clarified the situation regarding high-level governance. I think it is fair to say that we have learnt lessons as we have gone along for a number of reasons. The programme clearly has evolved, we got into OGC-type governance and we have started to look at how we might better place governance on many factors as a result of the Report. I am the senior responsible owner in that I own the network in its totality. I am not actually designated as the SRO for Bowman itself, but I do oversee all of the network programmes that contribute to network-enabled capability in the round. Working for me now, largely in accordance with the Report, I have a Director of Equipment Capability who is the single point of accountability and under him he has a programme office, again in line with the recommendations of the Report, to make sure that we pull together all of the constituent strands and my colleague, ACGS, clearly provides all of the user land input to that particular process. We think we have now got a good handle on how we are taking this programme forward.

**Q5 Chairman:** But what other jobs do you do?

**Air Vice-Marshal Butler:** I look after command and communications and intelligence and surveillance processes end to end and it is very difficult to split some of them out because clearly one depends very much on the other, but, in providing the network in its entirety, that is entirely my responsibility, particularly in the equipment regime.

**Q6 Chairman:** But, with your experience, do you think it might have been helpful if at an earlier stage we had had a senior responsible owner who was full-time with this project with a full-time staff? Do you think that might have been a useful thing to have done?

**Air Vice-Marshal Butler:** Yes and no. I think the more difficult piece for us is to pull together Bowman as part of a wider system. Again you could argue that the Director of Equipment Capability, who has single-point accountability for Bowman itself, is responsible for making sure that happens and of

course he has a small staff in the programme office that is pulling all of this together, and I am there overseeing to make sure that Bowman plays its part within the wider network-enabled capability because clearly Bowman alone is not sufficient to produce what we need militarily. We need a range of communication systems that will provide the comms system which we require in its entirety.

**Q7 Chairman:** Okay, I will leave that subject for a moment and other colleagues may return to it, if they wish. Mr Jeffrey, would you like to look at paragraphs 3.14 and 3.15, “Costs of delivering training were underestimated”. What this paragraph seems to suggest, Mr Jeffrey, and please pass this question on to your colleagues, if you wish, is that there was a rose-tinted business case for Bowman CIP. Do you think that is a fair criticism?

**Mr Jeffrey:** It is fair to say that training costs were not fully assessed in the very early stages. It is also fair to say that we were on to it as early as September 2002 when a training needs analysis was done which did enable a better account of the training requirements to be made. What I think would be a fair criticism is that we tended to assume in the early stages that the training implications of this system would be much the same as for its predecessor. In fact it is a much more capable and wide-ranging system which makes more demands on our people and, therefore, carries with it, I think as Major General Rollo would say, a more significant training requirement.

**Q8 Chairman:** General, do you want to comment?

**Major General Rollo:** I would. The other point I would make is that it is not just the initial training build. It is not like something where you just pick it up, you train once and then stop and you then have it in your head; it is something which requires continuation of training on a regular basis if you are going to make the best use of what is, as Mr Jeffrey has said, a complex capability.

**Q9 Chairman:** What I put to you, Mr Jeffrey, is that the business case was deliberately fudged to get this through.

**Mr Jeffrey:** I do not believe that to have been the case. In the original business case, way back when we first attempted to create this capability, I would not care to say how training was dealt with in that, though some of my colleagues may have a recollection of it, but we came to make the case for the procurement from General Dynamics (GD), our existing suppliers, and I think there was an honest attempt made to estimate the training required at that stage, but it turned out to be well short of what in fact we needed.

**Q10 Chairman:** Well, let us leave that for the moment. Let us look at your vehicles now and figure 17 shows nice pictures of variations in the land vehicle fleet. You have had all sorts of problems with



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**Mr Bill Jeffrey CB, Major General Bill Rollo CBE, Air Vice-Marshal Stuart Butler, Ministry of Defence and  
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this, have you not? Why did you not have the design data on these vehicles available so that you could fit the kit to the vehicle? It is pretty basic, is it not?

**Mr Jeffrey:** Well, the fact is that the fleet of vehicles, partly as a function of the age of our fleet of armoured vehicles, varied more than one might expect. Some of them were variations that had been built in at the time of manufacture and some had been built in over the years to meet operational demands.

**Q11 Chairman:** But have you learnt any lessons from this? If we were to look at some future programme now, have you learnt the fairly obvious lesson that kit has to go on the vehicle and the vehicles do vary enormously?

**Mr Jeffrey:** We certainly have, yes, and I think also there will be lessons for the FRES acquisition when it comes to pass as well because we must hope in future to have a fleet of vehicles which does not vary quite as much as this one did. It is undoubtedly the case that, with the benefit of hindsight, there should have been a larger survey because, when they came to make the conversions, GD were surprised at just how much variation there was within the population of vehicles that we have.

**Q12 Chairman:** Well, I am surprised that you were surprised, frankly. Major General, do people not realise that your vehicle fleet varies enormously on the ground?

**Major General Rollo:** Having grown up with it, it is something that I am very conscious of and I am not sure why that was not the case. What I do know is that when we started putting vehicles into the conversion programme, we ran an organisation to bring them up, as far as possible, to the installation standard and we have been doing that over the last three years. As far as the future is concerned, I am quite clear that we do need to have a much better grasp of the configuration of our vehicles not least because we are going to need to with digital platforms and with these radios. We have a computer programme called JAMES 2 which is effectively a very large database which will give us a much greater degree of definition as to what the standard is in what vehicle. Within the Bowman programme there is also a system which will tell us not only that the radio is in there, but what standard of software the radio is fitted with. Unless we get that right, we will have awful difficulty in doing the incremental programmes of upgrades that we need to do.

**Mr Jeffrey:** The other point I would make, if I may, is that in terms of the actual conversion programme, we are definitely over the hump with the company getting on top of it. The weekly rate of conversion peaked recently at 84 platforms a week which is more than was happening when this Report was published. We have fewer than 6,000 vehicles to go and they are less complex vehicles, so we feel that we are getting towards the end of it and can finish it next year.

**Q13 Chairman:** Can we just ask one of you please about how it is now performing operationally. This is covered in figure 7 which you will find on page 13. Which one of you would like to tell me how Bowman is performing in Afghanistan and Iraq?

**Mr Jeffrey:** Well, perhaps I could make a general comment and then invite the Major General to say something. I was struck, as I prepared for this hearing, by the fact that a capability which we are now rolling out in several tranches, even after the first tranche is available, to deployed troops is as popular as it is. It is clear both from this Report and from other reports that I have had that, when it is used by real troops in a deployed situation, they do find it gives them options that were not there before and that communications can take place much more quickly and much more effectively.

**Q14 Chairman:** Perhaps, Major General, you can add to that. Give us a sort of more operational view from your own end as to how it is performing in Iraq and Afghanistan.

**Major General Rollo:** I think I would mention two really positive points. The first is that with HF radios, in the past HF was not only insecure, but also difficult to use. The Bowman HF radio is much easier to use and it is secure. You do not have to use manual codes in it which really speeds communication up enormously. It is also relatively long-range, so if you think of a place like Iraq where you are operating quite often over quite big distances, to have a secure radio with that range is of tremendous utility. The second aspect which I think is borne out in the Report is the business of so-called 'situational awareness', the ability to know where people are, to have a digital map within an operations room and to be able to say, "Right, that is where that convoy is", and again working over big distances going up between, for instance, Basra and Al Amarah where there was a series in the past of black holes, you can now track all the way up and know where they are, and that is again of obvious operational utility.

**Q15 Mr Williams:** Mr Jeffrey, you said you have many lessons to learn and you still think you are going through the learning process, as far as I can gather. If we look at page 25, in bold print there is a sub-heading on the section, "The full costs of delivering the capability have emerged since the contracts were signed". If you go to page 26, there is another bold-print sub-heading, "Costs of integration with other systems have emerged". Then you go to page 28, "Costs of delivering support were underestimated", and then if you go to page 31, again still in bold print, "Converting the land vehicle fleet to Bowman has been more challenging than expected". Is there anything you did right?

**Mr Jeffrey:** I think in each of these cases it is undoubtedly the case that it took the attempt to implement the programme, which, let us remember, was quite close to the leading edge technologically, to discover some of these issues and assess their implications.

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**Mr Bill Jeffrey CB, Major General Bill Rollo CBE, Air Vice-Marshal Stuart Butler, Ministry of Defence and  
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**Q16 Mr Williams:** With respect, that is not true. According to paragraph 2.13, and I am not suggesting you are lying, but perhaps you have been badly briefed, it says, “Directors of Infantry have stated since the late 1990s that increased weight and size are unacceptable”, particularly for foot soldiers. “The Integrated Project Team”, and this is all before your time, so you are not responsible for this, “did not obtain Director of Infantry’s acceptance of its size, ergonomic and weight characteristics”. It did not even find out what was wanted. What went wrong? Who was responsible?

**Mr Jeffrey:** Dr Watson may want to say something about that. My reading of the papers in preparing myself for this hearing does suggest that, first of all, we did not get this right—

**Q17 Mr Williams:** I think that is the most self-evident thing anybody has ever said here!

**Mr Jeffrey:** We ended up with a radio which, for specific purposes for dismounted troops, is heavier than the Army required.

**Q18 Mr Williams:** But you knew that early on.

**Mr Jeffrey:** We were trying hard though, I am persuaded, to deliver both the specifications for the radio and something that—

**Q19 Mr Williams:** That is not how it sounds if you go further down that paragraph. The Department actually agreed with the company that it was not the company that was at fault, but the company supplied what it was asked to supply in the contractual system requirements document, so the company is not at fault, the Department is at fault. It goes on to say that the Department “is now examining alternative ways of meeting the specific needs of dismounted troops”. Now, back in the 1990s you were being told by the Director of Infantry that it was no good, that it was beyond ergonomic practicality for a foot soldier to cope with and now we are told that you were now examining, at the time this Report was written, which is not all that far back, ways of meeting the specific needs. Where do you start in that Department? When do you get into the real world?

**Mr Jeffrey:** What I would say, and Dr Watson may want to add to this, is that I do not believe that those who were trying to provide this system were ignoring what the Army was saying. I think they were trying to take account of both the weight requirement and the radio specification and they clearly failed to produce a radio that met both. When we came to take stock early in 2005, we had a difficult decision to take. We had to decide whether to go ahead with it as it was and get the significant benefit that we are now getting from it and separately, as we are doing, pursue ways of getting a lighter-weight radio or whether to hold things up.

**Q20 Mr Williams:** But here we are in two wars and, as it says in our briefing, five years into the programme the Department still does not have a way forward to meet the infantry’s requirement for

a section radio in dismounted combat. Now, when I look at my television, I see these poor soldiers in Iraq and in Afghanistan having to go out and face hazards which none of us would wish to face and on a daily basis, they are often isolated because of the tactics which are being used in Afghanistan and we find that they do not have adequate communications systems. Their survival depends on quick action, quick reporting, quick response and the help of the gunships getting the men out of there rapidly. This is appalling, is it not?

**Dr Watson:** May I take on this point. If you are looking for a particular responsible officer at the time, I was Bowman IPT leader when this contract was let and when this specification was arrived at. We have made a significant investment in the development of radios specifically to deal with the infantry-carried requirement. We had gone through a period of examination of what was possible and we had had very extensive engagement with the land Army, including the Director of Infantry and his representatives. At the time that this contract was let, it was quite apparent that we could not combine both the radio performance characteristics and the weight, therefore, the system requirement document.

**Q21 Mr Williams:** Let me tell you this: it is all well and good, except that in paragraph 2.14, it says, “. . . the Department recomputed the Bowman requirement in 2000”, and you say you had been looking for ways of dealing with that, but that is not what it says here. “This was a brisk process”, a brisk process, “and in General Dynamics UK’s view, bidders were not able to spend the time with military units that would have given them a deeper understanding of how the Armed Forces would use Bowman CIP and would have enabled them to have offered better-designed proposals”. That was years ago. That was in 2000. What is wrong with the Department that it cannot get a contract like this right? It is not the most difficult one it has ever had to negotiate.

**Dr Watson:** This is not germane to the question you are asking. The point is: was the infantry-carried radio inadequately specified? The priorities given to me by the customer, and accepted by the Army broadly, were that the priority was to achieve the radio communications performance. We could not achieve both. General Dynamics were given a free choice and they chose to use the ITT radio which had been subject to significant earlier investment in order to achieve just these characteristics.

**Q22 Mr Williams:** You talk about priority and now we hear again that the facts do not fit in with what you are saying. A deal was negotiated with General Dynamics in October 2005. That is agreed, is it not?

**Dr Watson:** Agreed.

**Q23 Mr Williams:** It took until July 2006, nine months, to get approval, so what was going on in that nine months? Was anyone examining appropriateness? Why was that nine months not

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**Mr Bill Jeffrey CB, Major General Bill Rollo CBE, Air Vice-Marshal Stuart Butler, Ministry of Defence and  
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being used at the beginning to give extra time for preparation instead of being wasted in deciding on whether you were going to go ahead with the contract or not? Who was responsible for the nine months' delay? Whose approval was being waited for?

**Mr Jeffrey:** It was a mixture of discussions within the Department leading up to the approval in our Investment Approvals Board of the approach which had been negotiated with General Dynamics in 2005 and then discussions with the Treasury because this was an adjustment to the programme which required their approval.

**Q24 Mr Williams:** And now the Department has to pay an extra £121 million three years after the planned in-service date to get a system free of problems. Now you are negotiating and it has cost £121 million. Is that not an appalling waste of taxpayers' money?

**Mr Jeffrey:** It is a regrettable additional expenditure, but it is a consequence of the process that our predecessors went through in which they discovered as they went that the technical challenge of delivering this programme was greater than expected. This was also a period, it has to be remembered, when new technical capability was emerging quite significantly, so the technology was changing in the world outside. It is highly regrettable that it reached the point clearly in 2005 where the right thing to do was to stop and take stock with the company of what it would take to deliver this programme in an acceptable form and in reasonably short order and which of the various capabilities that we had been seeking were better examined more carefully, as the last part of the Report says, going further into the future. Now, that is sub-optimal, to say the least, but it is in part at least a consequence of the very challenging technology that we were working with and the extent to which the conditions in which we were working were changing as the programme progressed.

**Q25 Chairman:** As a point of reference to that line of questioning, if you look at appendix 5 on page 48, you will see here that you granted, Mr Jeffrey, or your predecessor did, in-service status in March 2004 subject to 27 major provisos, 20 of which still apply. Why did you do this?

**Mr Jeffrey:** The first point to make is that the practice of bringing equipment into service with some provisos—

**Q26 Chairman:** But 27 major provisos, of which 20 still pertain.

**Mr Jeffrey:** I think the position now is that significantly fewer than 20 still pertain<sup>1</sup>, but if I go back to the general position, the NAO published a Report in February 2000 on the MoD accepting

<sup>1</sup> *Note by witness:* 20 provisos currently remain against Bowman but the recast programme (described in Part Four of the NAO Report) is in the process of clearing them and we expect formally to remove them all in 2007.

equipment off contract and into service in which they recommended that we should make more use of provisos to secure early operational benefits where

**Q27 Chairman:** Well, let us ask the National Audit Office if they are happy, if they think this is good value for money and something we should do in the future, that we should be putting kit into the Armed Forces with 27 major provisos. What does the National Audit Office have to say about this? This has been quoted and apparently it is your fault, that you told them to do this.

**Mr Banfield:** As the witnesses have said, there is clear operational benefit coming from the systems in operation as now. It is a very finely balanced judgment call at which point taking some provisos, or taking 27 provisos, becomes the right thing to do.

**Q28 Chairman:** What do you think?

**Mr Banfield:** The most important thing is whether you have a clear route to be able to clear those provisos quickly and at the time of our Report there were still 20 there, which meant that they were not delivering full performance and, as our Report says, if you put something in service, you do start to raise users' expectations about what that equipment can do when there will still be limitations on it.

**Q29 Mr Williams:** And with only half the capacity with 120, so there were 240 terminals you asked for.

**Mr Banfield:** That was one specific element of it, yes.

**Q30 Mr Touhig:** On page 7, Mr Jeffrey, 1.2, it refers to "intense pressure to bring Bowman into service". I would just like to move back very slightly to pre-Bowman, to Clansman. Clansman, as I understand it, was designed in the 1960s, brought into operation in the 1970s with a lifespan of 15 years, taking it to 1985, yet you did not decide to replace it with Bowman until 1988. Why the gap of three years? What were you doing?

**Mr Jeffrey:** It is certainly the case that Clansman had been recognised at that stage as needing replacement for quite a long time. It uses the previous generation of analogue technology which we certainly could not have supported the network-enabled capability with. We were looking at the requirement for a new technical combat communication system from the late 1980s onwards. I cannot account for every month of the period that you have referred to, Mr Touhig, but I think my surmise, and my colleagues may be able to shed more light on it, is that there was an examination going on of how best to devise an alternative system to Clansman given the shortcomings which it evidently had.

**Major General Rollo:** Mr Touhig, I am not sure about the dates.<sup>2</sup> My personal experience was that I first got Clansman in Germany, I think, in 1980. I then came back to England to a regiment which did

<sup>2</sup> *Note by witness:* Clansman radio fielding commenced in 1978 and full deployment was achieved in 1983. Service life was expected to be around 15 years from the latter date.

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not yet have it and we converted that regiment in 1982, so if it had a 15-year life, that would have extended it beyond the period you have mentioned.

**Q31 Mr Touhig:** Well, Clansman was not right either. Therefore, post the Clansman period in the 1980s and 1990s, our Forces were using kit designed in the 1960s. Now, if you had something which was state of the art, or state of the ark because this is pretty old stuff, you took decisions thereby denying our people top-quality kit because you were so slow at getting off the mark. Clansman had been allowed to run through, not enough thought had been given to its replacement and then you faced all the pressures, pressures which, in response to some of the questions from the Chairman and Mr Williams, actually accelerated your need to replace Clansman pretty quickly.

**Mr Jeffrey:** It is certainly the case that the timescale that the Report sets out for the consideration of the replacement of Clansman was as you have described. I am sure it could have been done more quickly, but equally, as Major General Rollo says, it was a system which was intended to have a 15-year lifespan which was capable of performing at the level it did. I do not think any of us are denying that it would have been much better if it had been replaced more quickly than turned out to be the case.

**Q32 Mr Touhig:** No doubt about it. If you move on to page 23, 3.1, there the C&AG's Report says, "Many of the difficulties encountered by the Bowman CIP programme arose because at the time of the programme business cases in 2001 and 2002 the Department underestimated the technical challenges, and hence the resources and time that would be required to deliver and support this sophisticated new capability". Has anything changed in the MoD?

**Mr Jeffrey:** If you are asking me whether things are better now, I think our systems are better, to pick up the point the Chairman was asking at the beginning. I now feel, particularly in the last few months as we have taken forward the report of Tom McKane on the way we manage procurement, that we have a clearer understanding within the Department of the distinction between those responsible for providing equipment the sponsor and the eventual user and we are using SROs, for example, more systematically than we were. I also think that we are more aware than our predecessors were of the issue of over-optimism, the importance of de-risking and the importance of making early investments in doing so. What I would say though is that, for all that, despite the fact that I believe us to be in better shape than we were and capable of getting into better shape still, if I may say so, when you are doing this sort of stuff with very challenging technology, there is always a possibility that the technological risk will be underestimated and that, as the programme is implemented, the technology in the world outside will change and the challenges involved in implementing the system will become more difficult.

**Q33 Mr Touhig:** I will come to some of those points, if I may, but when I was a Defence Minister, I remember receiving a submission about a contract I was being asked to approve, it had taken four months to get from those who did the work to let the contract to get to me and the officials must have thought, "What is this mad Minister doing, taking four months to make up his mind?" When I made enquiries, I discovered that it went through multiple layers of consideration where each of the Services wanted to consider it and the Civil Service wanted to consider it. Is that not part of the problem in the Ministry of Defence, that all these things are so multi-layered under consideration that it takes one hell of a time to get a decision?

**Mr Jeffrey:** I certainly think that the processes are more complicated than they need to be. One of the recommendations of Tom McKane's report which I mentioned is that we should look particularly at the way our internal approvals process works in practice. On the other hand, we always need to be conscious of the requirements to spend taxpayers' money sensibly and we always need to be conscious of—

**Q34 Mr Touhig:** I appreciate that and I accept that entirely. The point I am making, Mr Jeffrey, is that you have three competing Services plus the Civil Service and everybody wants to have their two penny-worth and it takes so long to get through the process. Surely in this day and age the MoD can work in a different way than this multi-layered consideration of every single project. The Chairman touched earlier on lessons learned. Is there now a standard of consideration at the end of every project to examine lessons learned, the good and the bad points?

**Mr Jeffrey:** There is, and that is exactly what we do, but if I could revert for a moment to the point about the layers of consideration within the Department, I do personally think, and this is relatively recent, that we can slim that down quite a bit. I think it needs a bit of consideration not just on the public accountability and expenditure side of it, but the user requirement side as well. Arguably, one of the lessons from this programme is that we did not do enough to take account of the real requirements of the Armed Services and it is a difficult challenge for the Department to keep these interests in balance in a way that does not overlap.

**Q35 Mr Touhig:** You have to bang their heads together, Mr Jeffrey, at the end of the day and say to the Services and to the civil servants, "We've got to do this more effectively".

**Mr Jeffrey:** Yes.

**Air Vice-Marshal Butler:** I actually lead as one of the two-star leaders for part of the McKane implementation looking at through-life capability management. One of the other work streams is specifically dedicated to scrutiny and approvals and we are trying to adapt very much the suggestion you

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Dr Iain Watson, Defence Procurement Agency**

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make in terms of making it a bit more simple and less bureaucratic, but also retaining the due diligence that we want to do for the taxpayers.

**Q36 Mr Touhig:** Well, we will see how you develop that point. The Chairman made the point at the beginning of course that you had no SRO, did you? There was no owner of this project at all. Now, when I was a Defence Minister, I owned the Met Office. I took credit for the good weather and I blamed the bad weather on my predecessor, but I was the owner. Why was there no owner of this major project right at the start? We have come in on it a few months ago, but this is really hit and miss, is it not?

**Mr Jeffrey:** First of all, there is a distinction between the ministerial ownership of an agency like the Met Office, which is important in itself, and the SRO role for projects of this kind. All I can say is that I believe strongly that the OGC advice on SROs is right. It is not straightforward to implement it consistently in the MoD because we have so many projects, but I think the right approach is to do what we have done which is to look at groups of closely related projects, like those for the network-enabled capability, and appoint an SRO in effect for them, but I quite admit that the handling of this programme would have been better in its earlier stages had there been an identified senior responsible owner.

**Q37 Mr Touhig:** No one owns Bowman, so nobody can be blamed when it goes wrong. It is the Civil Service in denial again, is it not? The Civil Service never seems to want to take responsibility for its decisions that go wrong and cost the taxpayer a fortune. It is endemic across Whitehall, do you not think?

**Mr Jeffrey:** I do not think myself that is a fair account. I certainly feel very responsible for the things that go wrong in the MoD. The truth is that, over a period of time, the best means of managing these big, complicated projects has evolved within government. We have learnt more about them and the OGC guidance is clearly sensible and well-informed and within this Department we are doing our best to implement it.

**Q38 Mr Touhig:** We have talked of the technological problems and the difficulty in the way the contract and so on developed, but there were some pretty basic mistakes early on. In fact if you look at page 31, paragraphs 3.16 to 3.20, we certainly get it clear from questions to you that converting the Army land vehicle fleet to Bowman had been more difficult than expected mainly because of the unexpected extent of the variation between vehicles. Now, that is pretty basic and that was not spotted and there were no discussions with General Dynamics at the time they were given the contract about that. This is not something you fit on to the top of your TV, is it? I have seen Bowman on warships, I have seen it in other platforms and so on and so forth, and it is complex, it is a different environment and yet I cannot see any evidence that this was really and truly considered at the early stage.

**Mr Jeffrey:** I acknowledged earlier that, with the benefit of hindsight, the degree to which our land vehicles varied in their configuration, because they had changed over time in some cases, was underestimated. I am sure there should have been some larger survey of the population of such vehicles before we embarked on this, but the fact is that there was not and the company—

**Q39 Mr Touhig:** You know, Mr Jeffrey, that I know GD because it is located in my constituency and one of the things they told me very early on that was a bit unexpected is that they have got people using this kit who have a reading age of 11. Now, again you and I know that we do have a problem within the Services to some degree that people do have a lower educational attainment. Now, it is no good giving some guys a heavily texted manual to operate this kit if they have basic literacy and numeracy problems. Was this not considered because we all agree that this is much more complex than Clansman and yet did this not seem to figure in anybody's thinking at the time?

**Major General Rollo:** I am not sure it is quite as straightforward as that. Different users have different requirements to operate the kit. On the whole, those bits which are complex and require people of a higher level of education and knowledge are operated by people with that knowledge. If you go to the Royal Signals, you will find plenty of private soldiers who, far from having a reading age of 11, have a degree.

**Q40 Mr Touhig:** I know that, but the point I am making is that this is a factor, it was not calculated, it was not taken into account as the work was being done in developing Bowman, yet all of us know that in defence, I have seen it, and you know, I am sure, there are problems about educational attainment at some levels within the Services.

**Major General Rollo:** I think the basic training package which has been criticised for different reasons is exactly that, it is basic and it gives a basic operator's understanding of how to work it. Those people who require greater levels of knowledge get greater degrees of training, so to say that no account was taken of that is a touch harsh.

**Q41 Mr Touhig:** Is there a culture in the MoD that when we have major projects, and I know I have criticised the fact that there was not an owner of this, we put a military person in charge? Is it the right choice all the time and rather than have someone who has a particular expertise or a skill, it is an admiral, an air-marshal or a general who takes charge of some particular project and is there a culture within the Department which feels, "Somebody in uniform has to take charge because we are the Ministry of Defence"?

**Mr Jeffrey:** I certainly do not think that. I think it depends entirely on the senior person who is best placed within the departmental structure to perform the SRO function and that has been my experience elsewhere in government. It is how, I believe, the

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OGC envisaged the SRO function working. Having said that, in the equipment field, the view we have reached is that because, in my judgment at least, we have tended to be a little confused about who the customer was and to confuse the role of the central equipment sponsor and the eventual user of the equipment, we have not been clear enough about where the role should actually lie. The best place to put it within our internal structure is with the central sponsor of the equipment programme who is, in relation to this sector, represented by Air Vice-Marshal Butler. Most of the people who operate in that field are military figures, but I certainly do not conclude from that, if you look right across the Department's business, including big IT programmes, accommodation and estates issues, that we should invariably have military people in charge. It is horses for courses.

**Mr Touhig:** I accept what you say, but on one final point, if I may, the Report does say, "The experience of Bowman suggests the Department is taking on more projects and programmes than it has the management capacity to handle". That is the point I make.

**Q42 Sarah McCarthy-Fry:** Our Members' brief characterises the Bowman procurement like this: "The system is incomplete and inflexible, conversion of vehicles and units has been slow, troops do not find the equipment flexible and intuitive to use and substantial technical challenges still remain to be overcome". Do you think that is a fair summary?

**Mr Jeffrey:** I certainly agree with the last bit. I think there are technical challenges which remain to be overcome.

**Q43 Sarah McCarthy-Fry:** But you do not agree with the first bit?

**Mr Jeffrey:** I do not think I agree, if I recollect the comment, with what is said about troops' experience of it because, as we were saying earlier in this hearing, although we are still very much in the first stage of the roll-out of Bowman and there is more to come, even the first stage has been, to my knowledge, warmly welcomed by those in theatre as a significant advance on what went before.

**Major General Rollo:** Let me pick up on the intuitive bit. I think it is absolutely fair to say that many aspects of Bowman are not particularly intuitive. It is a complicated bit of kit and we are asking it to do quite complicated things, hence the comments made right at the beginning about the training build and the need for continuation training. Those people who have gone through the full package and have had the opportunity to exercise properly all the way through have made a lot of progress in learning how to make the best use of its capabilities, but it does take hard work. What we are doing as we progress and as we look at the next software drop is constantly to try to make it more intuitive and easier to use as well as getting the same or better functionality about it. I think if you look at the way

that private sector software is developed from the very early days of computers, you will see a similar process.

**Q44 Sarah McCarthy-Fry:** There is obviously a concern that, as we get these upgrades and these new things come forward, are we going to find ourselves in the same situation as we did just after Bowman with yet another huge great ramp-up of costs and then actually find we cannot use it? Are you happy, Mr Jeffrey, that we now have the procedures and the mechanisms in place to make sure that we do not make those same mistakes again when the next level of technology changes?

**Mr Jeffrey:** I am certainly happy that we took the right decision in 2005 when we identified those elements which were mature enough and about which we were confident enough to bring them forward in what is known as 'Bowman CIP5' which is the next phase of the roll-out which will take place mostly later this year and for about 12 months or so after that.<sup>3</sup> The other thing that was done in 2005 was, however, to identify, and I put it this way, the more aspirational aspects of the original Bowman package which are technically more challenging and to put in hand some studies which are part of our current deal with GD to explore these. Now, the estimate of cost for these which is in the Report is very much a ballpark estimate.

**Q45 Sarah McCarthy-Fry:** Is that the £121 million?

**Mr Jeffrey:** That is the £200 million, but what I think we ought to do, and will do, is to conduct these studies, to look very carefully at what they produce and to take a considered decision on where to go from there.

**Q46 Sarah McCarthy-Fry:** What is your working relationship with GD like because I notice that if you look at page 37, paragraph 4.7, "The Department and General Dynamics UK have different perspectives on how much of the . . . additional funding represents new or changed customer requirements"? If that is always fundamental to any contract, what is a changed requirement and, therefore, possibly falls on the contractor and what is a new requirement which is funded by the procurer? GD UK's position is that they have delivered their contractual requirements. How is your negotiating relationship with them now?

**Mr Jeffrey:** Well, there is a difference of perspective on that issue and it reflects the fact that our view is that the basic capability requirement is as it always was. It is more, as we have gone through the process, that it has become clear that changes have to be made in order to deliver the product. In that sense, the difference between us and GD may not be quite as great as it seems, but difference there is. What I do believe though is that our ongoing relationship with

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<sup>3</sup> *Note by witness:* The roll out of the BCIP 5 level of capability is planned to commence in late 2007. The estimated timescale to complete fielding is still to be confirmed.

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GD as the deliverers of this system is quite good at the moment. I do not know if my colleagues here might want to comment.

**Dr Watson:** It is good. There is no ambiguity in the requirements for the ongoing work and, as far as I understand it, we continue to have very good working relationships with GD at every level of management.

**Q47 Sarah McCarthy-Fry:** Are we procuring a specified product or are we procuring a specified outcome?

**Mr Jeffrey:** I think it is more a specified outcome than a specified product. What we are trying to do is to generate a capability of a certain kind for the military in a rapidly changing environment in which what is possible can actually change almost month by month, never mind year by year. Therefore, it is not in some ways surprising that our predecessors were not able to say at the beginning, "This is the product" and, lo and behold, exactly that product emerges at the end of the process, but it has been more that, for all the shortcomings which this hearing has explored, we had a specification at the beginning of the kind of capability we were looking for to replace Clansman and then a journey, if you like, with the company through a process which has illuminated more and more how best we can provide that capability.

**Q48 Sarah McCarthy-Fry:** I am not a technical person, but I was very interested in Alan Williams' line of questioning on the weight. I have just got a new mobile phone which is about half the weight of the other one and does twice as much, yet in Dr Watson's reply to Mr Williams, "We had to prioritise, so we were only able to deliver the technological bit and we had to give up on the weight", which means that it is very difficult for troops to use. Why can we do it in civilian technology and not in military?

**Mr Jeffrey:** Well, the short point is that this is a lot more than a mobile phone. One of the most challenging aspects of this is that, whereas mobile phones rely on fixed points through which the communications can go, this is something that has to be mobile and it has to be capable of communicating with other holders of the system without intervention of any fixed points and it has to be capable of operating in very difficult conditions, so the specification is much, much more demanding. I have the technical expert on my right, so perhaps he would like to enlarge on that.

**Dr Watson:** Your comment is a fair one and certainly in consumer electronics we see increases in capability and, therefore, some reductions in weight have taken place. In this particular field, there are a number of drivers which do not obey those same laws. If we want to get a particular radio range, then we need a particular-sized amplifier and that is not something which gets miniaturised over time. If we want it to be robust and survive in a very harsh environment, then there is a certain degree of investment which we have to make in its design to

make it hard enough. All of those things actually give us a baseline against which it is necessary to do clever things with the rest of the electronics. The quoted figure, for example, on the infantry-portable VHF radio is around five kilograms, if I remember rightly, and the actual radio component of that is 0.7 kilograms.<sup>4</sup> The rest of the things, like big aerials, big batteries, carrying equipment, a user terminal to do some of the data-entry and display, all of that package is actually driven by some areas which are capable of being done as technology advances and some which are really very intransigent against that.

**Q49 Sarah McCarthy-Fry:** My concern going forward is that we have not changed enough to take into account all of the different things. Presumably you now have an owner of the project and you now have a project team in place that is continually looking at the risks of the project going forward, but are we also looking at other technologies which may impact on this, and I am thinking in particular of new satellite technology that both the American and European space agencies are putting up there? Will any of this equipment that we are procuring now be in conflict and may it not be compatible with other countries who maybe get to move faster than we can?

**Mr Jeffrey:** There is certainly an issue about linking this system into a wider network which is why Air Vice-Marshal Butler is taking the overview of this. Perhaps I can comment on the question about risk and then perhaps bring in colleagues on the keeping-an-eye-on-other-technologies point. On risk, I think we have a clear system for managing this. We certainly have a clear picture of who owns which risks and by having a programme office, as we were discussing earlier, the programme office ensures that the risk-owners are identified and it takes the necessary steps to mitigate them. So we have better systems in place for managing risk, I believe, than we had before. In addition to risk though, there is opportunity and I think that is the second part of your question which is whether we are alive to the fact that the technical world outside may be coming up with even more sophisticated options. I do not know whether Dr Watson would want to comment on that.

**Dr Watson:** We are aware of that and clearly we are looking at technology refresh of various sorts. To take up one of your points, which is the comparison between the radio system we have and satellite communications, Stuart Butler takes an overall view of that and indeed my area of projects does a lot of work in delivering these things. Satellite communication was favoured for years by the US Forces for entry into Iraq and now they make much greater use of HF radio in the same way as we do. The reason for that is the robustness of the communications system, the reliability and indeed the ranges that are achieved for reasonable investment and cost. Whilst technology opens up avenues to us, we have to be aware of all of the

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<sup>4</sup> *Note by witness:* Radio component weight is 1.05 kg.

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consequent infrastructure that goes with that. We use a mix of communications and we use a mix of processing systems to achieve the best operational effect for the minimum cost.

**Q50 Sarah McCarthy-Fry:** The Defence Industrial Strategy, which has been published, on the way we move forward is much more about long-term partnership with industry. You talk about how you are doing risk management here, but what risk-sharing are you planning to build into your future relationship with GD?

**Mr Jeffrey:** We certainly envisage that the support of the system longer-term should be the subject of a partnership of the kind which is described in the Defence Industrial Strategy and there is work going on now to scope that and to prepare for a partnership of that kind.

**Q51 Sarah McCarthy-Fry:** Do you think that, if you had had that sort of relationship with the contractor right back at the beginning, it would have prevented some of the problems you have had?

**Mr Jeffrey:** I think if we were starting from scratch with our present perception of what works best, which is, generally speaking, that it makes sense to think in terms of acquiring capability through-life rather than kit, we would have been looking at the acquisition of not just a radio system, but a radio system with the through-life support built into it. In practice, what we are doing is acquiring the kit and then moving on to a through-life support deal of the kind that would be consistent with the Defence Industrial Strategy.

**Q52 Sarah McCarthy-Fry:** That may well be more expensive than it would have been if we had built it in in the first place.

**Mr Jeffrey:** Possibly so.

**Q53 Mr Khan:** I have nil military experience, so I know very little about the Armed Services, but I expect that a successful military operation requires proper planning, a commander-in-chief, a chain of command, realistic ambitions and proper project management. Is that fair?

**Major General Rollo:** Yes.

**Q54 Mr Khan:** How alarmed should we be that this defence procurement project demonstrates a wilful lack of planning, no senior responsible owner, an unrealistic and over-ambitious project and no real project management?

**Mr Jeffrey:** Well, I do not think, if I may say so, that that account is quite a fair description.

**Q55 Mr Khan:** That is lifted from the NAO Report.

**Mr Jeffrey:** I do not accept that and I do not read the Report in that way either, frankly.

**Q56 Mr Khan:** Really?

**Mr Jeffrey:** I think it is a project which has had a number of difficulties, there have been shortcomings in the way it has been managed and it is also the case

though, as I said at the beginning, that at various stages where it has proved difficult, the Department has stood back and made a judgment—

**Q57 Mr Khan:** When was the delivery date for the equipment, the original delivery date?

**Dr Watson:** March 2004, as achieved.

**Q58 Mr Khan:** March 2004 for all of it to be—

**Dr Watson:** No, for the initial capability.

**Q59 Mr Khan:** So you are happy with that target being met?

**Dr Watson:** I am not because there are, as we have covered, a number of provisos, a significant number of provisos.

**Q60 Mr Khan:** And those provisos have had no impact on the safety of our troops?

**Dr Watson:** Not on their safety, no.

**Q61 Mr Khan:** So we should have no cause for alarm or concern about the safety of the troops using this equipment?

**Mr Jeffrey:** I do not think there are implications for the safety of troops, as such. To revert to your original question, I am not for a moment sitting in front of this Committee and saying that this project was brilliantly handled at every stage; clearly it was not. All I am saying is that it was not a complete failure in terms of project management either and that, and I think this emerges from the NAO Report, sensible decisions were taken in the situation which existed at the time. That situation was partly a consequence of the way in which the project had been managed and it was partly a consequence of the exceptionally challenging and technical environment in which the work was being done.

**Q62 Mr Khan:** You do not think the project was over-ambitious?

**Mr Jeffrey:** I think there were respects in which at the very outset it probably was.

**Q63 Mr Khan:** Do you accept that any error has been made?

**Mr Jeffrey:** Yes, of course.

**Q64 Mr Khan:** Over what period of time were the most errors made? It was obviously before your time, but what period of time would that have been?

**Mr Jeffrey:** I think, looking back on it, that the appointment of the initial consortium turned out to have been a mistake because the Department had to decide, and I forget the exact moment in time, but in 2000 or thereabouts, that the actual consortium was not delivering and we had to rethink at that stage.

**Q65 Mr Khan:** Who made the original decision?

**Mr Jeffrey:** The original decision to appoint the Archer consortium was made by the Department in 1998.



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**Q66 Mr Khan:** It is more who in the Department made the decision, which part of the Department and which management team?

**Mr Jeffrey:** In the late nineties?

**Q67 Mr Khan:** You are the Permanent Secretary. Who was responsible? Which people were responsible for the decision?

**Mr Jeffrey:** The decision to appoint the Archer consortium, which would have been in the late nineties, would have been the product of a process rather like the one we have now where an internal board considers an investment decision, considers a business case which describes what advantage we hope to get from the project.

**Q68 Mr Khan:** Do you think the internal board now realise they made a mistake?

**Mr Jeffrey:** We are talking about 10 years ago.

**Q69 Mr Khan:** That is my point, you see, because the internal board make the decision and move on to other positions and may leave the Department, so how can they learn the lessons from this woeful error?

**Mr Jeffrey:** All I can say, and the NAO Report I think brings it out in a very clear and balanced way, that we feel we have learned lessons from this experience. We feel that our acquisition practice is informed by these lessons and we very much want to do this sort of thing better in the future, but we will never get it absolutely right because these projects are huge and demanding and involve technologies which mean that you cannot have a perfect view at the point when you plan the activity of how it is going to turn out.

**Q70 Mr Khan:** I am going to take you to a question the Chairman asked. It is figure 19. The Chairman has alluded to this. This shows that you were not reaching in May this year the conversion necessary to complete conversion of all brigades to Bowman CIP by the end of 2007.

**Mr Jeffrey:** We still believe that we are on course to finish conversion in 2007, although there is—

**Q71 Mr Khan:** If we go to figure 16 we see that we are only doing 62 of the Bowmanised helicopters when the project was set up to convert 236. Why is that?

**Mr Jeffrey:** I do not know the answer to that question. We could certainly write to the Committee unless one of my colleagues knows.

**Dr Watson:** I think I do. This is changes in the fleet of helicopters that we intend to support for the future, so there are a number which have been dropped from the programme.

**Q72 Mr Khan:** So they are decommissioned helicopters?

**Dr Watson:** They are either being decommissioned or indeed they will be decommissioned in a sufficiently short period of time.

**Q73 Mr Khan:** Can you turn to paragraphs 4.1 to 4.5? In October 2005 the Department agreed with GD UK an additional £121 million of funding and a two-year extension. You are still confident they will meet that deadline?

**Mr Jeffrey:** The £121 million was the additional cost of the negotiated outcome with the company in the early part of last year and that included setting the target date which we are working to for Bowman CIP 5 and for the implementation of the initial Bowman functionality itself, so I do not think there is any slippage there. To come back to the point you were making earlier about the conversion, we believe we are on course, although with as many of our forces deployed operationally as there are now there is always a risk of slippage. We believe we are on course to complete conversion during the course of 2007 and the plan at the next stage is to introduce the second tranche, the thing that we have been describing as Bowman CIP 5, which brings very significant improvements in the system starting during the course of next year and going on for 12-18 months after that.

**Dr Watson:** I can add to that. The technical programme is on schedule. The conversion programme is proceeding at a higher rate with that 2007 date looking probable. There is a risk of slippage in fielding B CIP 5 and the reason for that is that with the operational load on the Army we may be unable to undertake the very large operational field trial in quite the original schedule that we intended. The knock-on effects of that will be relatively small. We can convert vehicles to the standard and then upgrade the software at a later point.

**Q74 Mr Khan:** This question may be for the C&AG, I am not sure. We read in the Report that the cost overrun to date is 5%, but that is with a reduced number of vehicles, ships and aircraft being converted. What is the real overspend, bearing in mind we have a reduction in those that are being converted? Can you quantify it? This 5% is deceptive, is it not?

**Mr Banfield:** The 5% is comparing apples and pears, if you like, because you are not talking of the exact number.

**Q75 Mr Khan:** It is comparing 12 apples with three pears, is it not?

**Mr Banfield:** Until the assessment studies which the witnesses have described work through we are not going to know how much it will cost to deliver the complete capability as originally envisaged. We have a figure in the Report of approximately £200 million but that could well flex significantly as they understand some of those challenges there.

**Q76 Mr Khan:** So how soon will we know how much this project has been overspent?

**Mr Banfield:** I think you are looking at two years' time to finish the study, so we will be looking at 2008.

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**Q77 Mr Khan:** How much bigger than 5% will it be? Twice as much? Five times as much?

**Mr Banfield:** That we will not know until that time.

**Q78 Mr Khan:** Roughly, at this stage.

**Mr Banfield:** If we took the £200 million extra you would be looking at probably something around 8%, but it is a very difficult figure to predict once the studies are ongoing.

**Q79 Mr Khan:** My final question, and the Chairman also alluded to this, is that one of the things we can infer from the Report, which is very critical, is whether the original business case understated the training and support needs of Bowman CIP to get the programme through the approval process. You refute that.

**Mr Jeffrey:** I was not around but I do not believe that to have been the case. It was certainly an underestimate.

**Q80 Mr Khan:** That was my point earlier on, you see. You were not around but those who were around, what is their answer to that allegation?

**Mr Jeffrey:** I do not know.

**Q81 Chairman:** No, you actually were around, so you have to answer.

**Dr Watson:** I was around.

**Q82 Chairman:** You were around so for once we can get an answer

**Dr Watson:** The answer is that the estimates put forward were the best we could make at the time. Certainly on the training area I would accept that it is probably right to say that there was a known lower estimate being put forward because of other circumstances and those other circumstances were this. We put forward an estimate for training specifically for that initial training capability which Major General Rollo has referred to. What was unclear to us was the extent to which the ongoing continuation training was to be overlaid with a broader exercise to refresh the training strategy in the Army at that time. I would accept that there was scope there for saying that we underestimated knowingly, but that was entirely due to those circumstances and that was exposed in the accounts.

**Q83 Mr Khan:** For those of us who are not experts, the perception we have when we look at value for money in defence procurement generally is that you are very poor at doing that. Is that a fair perception to have?

**Mr Jeffrey:** Let me take a step back. I came into the MoD almost a year ago. I think that we have made significant improvements in the last few years in our practice in procuring big bits of equipment. My sense is that we are probably better than many others in Government, partly because of the scale on which we operate and the attention we have given to this over many years. That is not to say that we are nearly as good as we could be, although we—

**Q84 Mr Khan:** So are you poor, average or good?

**Mr Jeffrey:** I think in across-Government terms we are probably good but we are not nearly good enough.

**Q85 Chairman:** I cannot accept that. Earlier you referred to Tom McKane's report and how much things are getting better. This Committee was set up by Mr Gladstone 150 years ago to deal with waste in the Armed Forces, and apparently we have been told that things have got better in the last six months. This is ridiculous. You are not seriously suggesting to us that you have one of the best records in Whitehall, are you, in procurement? Are you really saying that?

**Mr Jeffrey:** No, I am not saying that, Chairman. I am saying two things. I am saying first that I think we compare, and NAO reports tend to bear this out, with other government departments. You may well say that is not a very strong field to compare oneself against, but I am also saying very frankly that I think we have some way to go. In the last few years in the Procurement Agency under Sir Peter Spencer's leadership we have made significant progress. I do not think our practice is nearly as good as it can be and all I was implying about Tom McKane's report was not that it has transformed everything; it clearly has not, but that it gives us a basis on which we can begin to make things still better.

**Dr Watson:** May I return to a couple of points which were made earlier about future escalation of costs? With regard to the BCIP6 implementation, the figure of £200 million which has been bandied around, that £200 million figure is one that the NAO picked up for the total bill of a likely refresh at that stage. The actual roll-out of the additional capability is of the order of £60 million at our current best estimate. The remainder of the £200 million is to pick up what I would describe as normal support costs for refreshing technology which would not be part of the original approval, so the likely further escalation, if any, is a much smaller number.

**Q86 Mr Mitchell:** You will have to help me as a layman. We are talking about two separate things really. We are talking about a radio, a Bowman radio, and we are talking about the Combat Infrastructure Platform, CIP. Are they both together in this context?

**Mr Jeffrey:** They are, but the CIP bit of it is in a very early stage and still has a good deal of development to do, I think would be the best way to describe it.

**Air Vice-Marshal Butler:** Yes, the CIP element of it is largely about moving data and things like situational awareness around the battlefield, ultimately automatically, whereas the radio bit is clearly what it says on the tin.

**Q87 Mr Mitchell:** So you could have put out the Bowman radio with its secure communications very quickly if you had just confined it to a radio?

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*Mr Jeffrey:* Yes.

**Q88 Mr Mitchell:** Why was that not done? Was it mission creep in that you decided to add CIP?

*Dr Watson:* We did examine that as an option in the programme. The two things that mitigate against taking that route are first that to do that would mean that we would have to take the entirety of the Army's fleet out of commission twice, first to fit the radio and secondly to fit whatever additional equipment is necessary for CIP. The second element to that is that the vast majority of the costs, and indeed some of the difficulties we have talked about—the platform conversion, for instance, are inherent in doing both of those things so that as a package that is a very poor option to pursue.

**Q89 Mr Mitchell:** Yes, but it would have been efficient and you would have got the Bowman radio and the secure communications out very quickly. Why could you not have a system and put the CIP capacity in as an add-on, as some kind of extra, at a later stage without stripping everything out of the vehicles and putting in new stuff?

*Mr Jeffrey:* It was something that was considered and my own view, I must say, Mr Mitchell, looking back on it, is that one of the better decisions that we took in the course of this was to say that if we could get a significant degree of the CIP functionality delivered over the same sort of period as the radio then it would be a much better approach because, as Dr Watson was saying, what has turned out to be the case (and we knew would be the case, in fairness) is that taking bits of the Army and other forces to a lesser degree out of commission in order to make those changes is very time-consuming and very difficult, so wrapping the two up together I think has turned out to be the better way of doing it.

**Q90 Mr Mitchell:** And it has also delayed things and made things more expensive and delayed the use of the secure radio by the Army in military situations.

*Major General Rollo:* If it has delayed it, it has not been by much, because, as was being said earlier, the in service date for the first bit was met in the end.

*Air Vice-Marshal Butler:* The system as was rolled out includes both the radio itself and the infrastructure to support the CIP element. There was very little delay in rolling the system out and, as Dr Watson described, to have fitted them separately would have required the vehicles to come back in and almost go through the same amount of time to fit the CIP infrastructure than it would have done fitting the two together in the first place, so there really was not much of a delay.

**Q91 Mr Mitchell:** That is helpful, but surely on both systems, the radio system and the CIP system, the needs of the three services are different. You mentioned the range of the radio. That is another problem entirely with the Navy and the RAF and yet I see that the Joint Network Board and the Joint Systems Board, to co-ordinate its integration with other communication systems, were not set up until

2003. If you have got two systems serving three services, each wanting to use them in their own way, it seems a bit late to set up an integrated supervision system.

*Air Vice-Marshal Butler:* There are two elements to this. One is that the basic core technical infrastructure in all cases is very similar. There are two integration issues here. One is integration into the particular platform, and we have already covered that—clearly different for the Navy, clearly different for an air platform and different for land vehicles. The other one is to integrate the particular equipment with the way the forces fight, and again that is why we have stood up these boards of late, but the fitting of the equipment was not considered at the outset of the programme.<sup>5</sup>

**Q92 Mr Mitchell:** That means that a naval vessel out in the Falklands, a personnel carrier in Afghanistan or a tank in Iraq or whatever are served by the same system even though the needs of both are very different.

*Major General Rollo:* Could I pick that one up for a second please because I think there is a slight misapprehension here?

**Q93 Mr Mitchell:** It will be on my part, I assure you.

*Major General Rollo:* The primary users of the Bowman system within the Air Force and within the Navy are people fundamentally doing—and I hesitate to say this—soldierly things. They are the Royal Air Force Regiment and they are the Royal Marines. The reason it is fitted into aircraft and into ships is that it is primarily designed to allow them to communicate with the people on the ground.

**Q94 Mr Mitchell:** Thank you; that is clear. Why though do you need CIP which seems a bit like internet communication to me? In the Report it says at page 1, box 1, “The ready availability on the civil market of mobile telephones offering not just voice communications but also text, pictures, video and ever faster links to the internet . . .”. Why is all that necessary for a tank or an Army vehicle in Afghanistan?

*Major General Rollo:* I think you need to take those various pieces in ascending order of aspiration. We start with secure voice, and this is something I am dead keen on.

**Q95 Mr Mitchell:** I can see that is vital. Do not bother with that.

*Major General Rollo:* The next one, which really does make a difference, is to have a digital map which shows you not only where you are, which is linked to a GPS, to a satellite signal giving you your own position, but also where your friends are, and you will then get an icon on that.

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<sup>5</sup> *Note by witness:* This refers to cases where it was not possible to take into account fitting of Bowman capability, for example Type 23 frigates.

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**Q96 Mr Mitchell:** It asks the question, which I often ask myself, “Where am I? Why am I here? What am I doing?”. Is that the CIP part of it or the Bowman radio part of it?

**Major General Rollo:** No, it is the CIP part of it.<sup>6</sup> That is the first thing that the CIP part gives you. The second thing you want to be able to do is effectively to pass short text messages, like an SMS phone, because that takes less time over the network and is less distraction. That leaves the voice network free for urgent communications, which is what you want to fight your battle. Nevertheless there is a whole large amount of background data which needs to be passed, so if you can have an internet over which that information is being passed automatically that makes you much more efficient and saves time.

**Q97 Mr Mitchell:** Is the CIP part of it as secure as the radio part of it?

**Major General Rollo:** Yes, it is.

**Q98 Mr Mitchell:** You hear so much about hackers getting into systems, even into the Defense Department in the United States, but it must give one fears that this is vulnerable to hackers.

**Mr Jeffrey:** It is intended to be completely secure. Just for clarity, the CIP part of it is not the Internet, as it were. It is an internet effectively operating in a similar fashion for the Armed Forces so that they can perform similar functions and pass information and data in similar ways and have the situational awareness that comes from the link with the GPS system.

**Q99 Mr Mitchell:** Okay, so they are not getting Sky Sports?

**Mr Jeffrey:** No, they are not.

**Q100 Mr Mitchell:** As for the thing that makes it interoperable, the claim is that it will stop people being killed by friendly fire, but it will only stop people being killed by friendly fire from us, not from other forces that we are in coalition with. Interoperability is a goal deferred and that is going to be fairly expensive, about £200 million to achieve that, so at what stage does that come in?

**Mr Jeffrey:** It is a goal which will be partly met in the intermediate phase, the one that we have been describing as Bowman CIP 5, which will produce some functionality, and my colleagues may be able to give more details of it, and which will allow interoperability with friends and allies, but full interoperability is part of the next tranche which is the subject of the current studies.

**Q101 Mr Mitchell:** You considered that the previous supplier—and I do not know why that contract was ended in 2000—would not be able to deliver Bowman, just Bowman, by 2004. If you considered that at that early stage why did the Department

consider it realistic to think that a replacement supplier could supply both Bowman and the CIP by the same date?

**Mr Jeffrey:** The decision that was taken, when GD were contracted with, was to aim for March 2004 as the in service date for Bowman itself. That turned out to be a well-founded assessment because we did in fact bring it into service at that point. What I think was over-ambitious was to set the in service date for CIP as December 2004, and in practice we turned out to have some slippage of about a year on that because we eventually got the first phase of it into service in December 2005.

**Q102 Mr Davidson:** Can I turn to table 16, “Progress in converting platforms to Bowman”, which talks about having planned to have 236 aircraft and helicopters and so on by January 2006? At the present time or up to January 2006 in fact there was none. Can you reassure us that there were no adverse impacts on the forces, operating as they were in Afghanistan and Iraq without this system?

**Mr Jeffrey:** I think the first point to make is that, as General Rollo was saying, this is not the whole RAF. This is the RAF regiment and the interaction with the deployed Army on land.

**Q103 Mr Davidson:** That is right. That is the relevance of Iraq and Afghanistan.

**Mr Jeffrey:** And, as the figures bring out, it is a very small part of the total project. I do not believe it to be the case that the fact that we had not converted any parts of the RAF was in itself impacting on operations.

**Q104 Mr Davidson:** You see, if not having it did not have any impact on operations, then in a sense you are tempted to ask what is the point of having it in the first place, so presumably there must be an adverse impact if you do not have it?

**Major General Rollo:** There are a number of different ways of communicating with aircraft in Afghanistan. There is a thing called TACSAT and there is a radio called the 117,<sup>7</sup> which is in service and has been used by 16 Brigade over the last six months.

**Q105 Mr Davidson:** So are all of these entirely acceptable alternatives?

**Major General Rollo:** We have produced a work-round which allows people to talk from Bowman to an Apache helicopter.

**Q106 Mr Davidson:** I will come to the Apache in a moment. Are you saying that maybe you have entirely acceptable alternatives, in which case why are we doing this? It seems to me there is a thought there. Either there were adverse consequences because of the delay or there were not. If you are saying to me that there were entirely acceptable alternatives then why did we need this?

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<sup>6</sup> *Note by witness:* The CIP capability is enabled by the Bowman communications infrastructure.

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<sup>7</sup> *Note by witness:* There is one radio, the PRC 117 which is a multi-band radio capable of VHF, UHF and tactical satellite (tacsat) UHF communications.

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**Major General Rollo:** This improves it, sir. It was workable before but when we get all of this working it will work better.

**Q107 Mr Davidson:** It will work better, and so there has really been a loss of capacity. Can I take up this point about Apache? We have looked at Apache in the past and this has been an enormous advantage to us, buying this; yet we read here that it has all got to be fitted with Bowman. I thought the point of Bowman was to allow units to communicate with each other, including those in support of ground troops, yet Apache is not going to be fitted with it. Presumably, if it is difficult to fit, surely all of that was taken into account at the time when Apache was being purchased?

**Mr Jeffrey:** For the reasons given in the Report, my understanding is that we concluded that it would be too difficult to install Bowman in Apache and another solution is being devised<sup>8</sup> for that purpose.

**Q108 Mr Davidson:** That is what it says in the Report, that is right enough, but did this not occur to you when you were purchasing Apache? Presumably you did not just buy it and then think, "What are we going to put in it?". Surely the process of planning Apache and the process of planning Bowman must have been proceeding at some point in parallel and surely there should have been some degree of crossover between the two?

**Mr Jeffrey:** I cannot immediately recollect what the two timescales were.<sup>9</sup> I suspect that Apache would be acquired earlier than would have enabled that sort of read-across to take place effectively.

**Q109 Mr Davidson:** But Bowman has taken so long that you must have been aware that Bowman was in the process of procurement when Apache was being ordered.

**Air Vice-Marshal Butler:** But at the time that the Apache came into service one of the considerations we had to make was what radio communications it would need with the people on the ground. It is a little bit like delivering the totality of the network that I described earlier. We have to make a number of considerations based on the timing of the various equipments that come in. One of my responsibilities will be to make sure that in delivering the totality of the network we make that sort of consideration and judgment, so we have certainly not dismissed the fact that Apache will never have it. It is just a matter of making sure it is properly phased so that we can deliver the totality of the network at the earliest opportunity.

**Q110 Mr Davidson:** So the intention is what, to have Bowman in there eventually, is it? I was looking at this and it seemed to me that you were going to have an alternative using ground vehicles, which is

presumably a man in a white transit driving along underneath Apache shouting up or something like that.

**Air Vice-Marshal Butler:** We certainly have a work-round with Apache at the moment simply because again it is trying to make sure that in phasing terms, and bearing in mind the helicopter is in use, as are many of the other constituents of the network, we phase in the equipment at the right time, but we certainly have not dismissed the fact that Apache will operate under the Bowman system in due course.

**Q111 Mr Davidson:** But the working upon Apache is going to cost an extra £25 million excluding VAT, and presumably that is going to be added to the overall bill. How many other projects are there like that where something has to be added to the overall bill to give us a more accurate figure of the overall cost?

**Air Vice-Marshal Butler:** Again, there are, as I say, a number of capabilities providing the totality of the network where we have to look at what is the most efficient communication system to enable it to give its maximum efficiency within the battle space. Apache is one, another example is ASTOR, the ground mapping aircraft, and again we have to look at how we can provide that and it is just looking at what the best system is and when best to schedule it to come into the system.

**Q112 Mr Davidson:** But all of these will be additional costs?

**Air Vice-Marshal Butler:** In some respects, yes, in some respects no. It depends where it was scheduled relative to Bowman, if Bowman happens to be the solution, and whether when we did that there were some costs included to provide a communication system of that type.

**Q113 Mr Davidson:** But potentially this is a real dripping hose for the contractor, is it not, if additional things keep getting added on and additional costs? We have had four in various other contracts. It is not necessarily the main contract that makes the money. It is all the add-ons and the changes and all the rest of it. This is a lifetime income stream for General Dynamics, is it not?

**Air Vice-Marshal Butler:** But that is not that uncommon. As technology moves on we realise that as we bring capabilities into the battle space they need better communications to make them more efficient. It is not uncommon for us to look across the totality of how we spend the money and decide that that is one of the capabilities that we will want to input to increase operational efficiency on the ground.

**Q114 Mr Davidson:** Can I turn to chart 15, which is again the point about the system support costs. It is this issue in the first column, "Basis of cost estimates at approval" of nil charge, and it ends up that there is a whole number of different charges that are going to be applied, and eventually it looks as if there is

<sup>8</sup> *Note by witness:* The Apache solution has been devised and is in service.

<sup>9</sup> *Note by witness:* The production contract for Apache was placed in March 1996, some five years before the letting of the Bowman contract.

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going to be an ongoing relationship under the Defence Industrial Strategy between the Army and the contractors as well as all these additional costs. Can you understand why we are a bit anxious about this sort of mechanism because here is a system which originally was intended to spend no additional money, where there are at least four additional sums identified plus an ongoing commitment. That does not seem to me like firm management. Is that fair?

**Mr Jeffrey:** It is certainly the case that some of these support costs were underestimated in the first place and, as the chart brings out, there are respects in which, as we learn more, we are having to revise these costs upwards.

**Major General Rollo:** Does the chart not also bring out though that we are using this kit on a daily basis on operations as opposed to it sitting in a unit in peacetime because it is only being deployed for a proportion of the year on training and therefore the usage is far greater and it is also in a particularly tough environment, though that is by the way?

**Q115 Mr Davidson:** So what are you suggesting to me, that the forces should not have anticipated that the kit that they were buying would actually be used? I assume the point you were making there was that if it had been just sitting quiet, idle, not being utilised, then some of these support costs would have been accurate, but in fact once you started using it the support costs escalated and you did not expect to realise those?

**Mr Jeffrey:** It is not so much that. It is more that, whether in use or in a state of preparedness for use, with new equipment of this sort you cannot get a really accurate take on support costs until you bring it into service and start using it and discovering how much it needs to be supported. It is up to us to make as good estimates of that as we can.

**Q116 Mr Davidson:** Does that apply to all your stuff then? Are you saying to us that we can never hold you to account for any mis-estimate of support costs on the basis that you never expected—?

**Mr Jeffrey:** No, I am certainly not saying that, Mr Davidson. I am simply saying that in this case part of the story is that we did underestimate the support costs, but to a certain extent, although not wholly, I would readily admit, that is explicable by the fact that with leading edge equipment of this sort you do not really know what it is going to teach you.

**Q117 Mr Davidson:** I have some sympathy for that position but if go/no-go decisions are being made and value-for-money assessments and so on and there is a consistent underestimate of support costs then obviously it distorts the whole decision-making process. It has always worried certainly myself and I know a number of my colleagues that projects from the MoD often get the go-ahead on the basis of estimates that subsequently are found not only to have been unrealistic but were always unrealistic and people then turn round and say, “Yes, that was unrealistic at the time”.

**Mr Jeffrey:** On that point I very much agree with you. One of the weaknesses, partly because it is difficult, in some parts of procurement is that we have been less good at estimating the full-life support costs than we have been at estimating the costs of acquiring the thing in the first place. Part of our strategy at the moment, if I step back from this project and look at the thing more in the round, is to imbue the Department with a sense of the whole project, including its through-life support and some better practice in estimating what the full-life support costs are. I think we can get much better at that but it is never going to be an exact science for the reason I have given.

**Q118 Mr Davidson:** And now that you are in charge we will not have any more of it?

**Mr Jeffrey:** I cannot say that, of course I cannot, but we are doing our best.

**Q119 Mr Bacon:** Air Vice-Marshal Butler, who appointed you as SRO?

**Air Vice-Marshal Butler:** I was appointed by virtue of the fact that I joined—

**Q120 Mr Bacon:** No, not “by virtue of”. Who appointed you?

**Air Vice-Marshal Butler:** I was appointed by the Military Secretary to take up the role of Capability Manager, Information Superiority, and hence took on the *de facto* roles of an SRO for both.

**Q121 Mr Bacon:** So it was the Military Secretary who appointed you?

**Air Vice-Marshal Butler:** Yes.

**Q122 Mr Bacon:** And he sits in the MoD?

**Air Vice-Marshal Butler:** Our particular Military Secretary now sits at Strike Command at High Wycombe.

**Q123 Mr Bacon:** And when you say “our”, are there several Military Secretaries?

**Air Vice-Marshal Butler:** There is a Military Secretary for each of the military Armed Forces.

**Q124 Mr Bacon:** So it is the RAF Military Secretary who appointed you?

**Air Vice-Marshal Butler:** We are appointed by a senior review body because, of course, my particular post is open to all three of the services.

**Q125 Mr Bacon:** Mr Jeffrey, this thing about not having a Senior Responsible Owner is not uncommon. It is a theme we have seen again and again. We saw it in the Rural Payments Agency the other day. Whose responsibility is it to appoint a Senior Responsible Owner?

**Mr Jeffrey:** It is the responsibility of the Defence Management Board ultimately.

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**Q126 Mr Bacon:** Which you chair?

**Mr Jeffrey:** Which I chair.

**Q127 Mr Bacon:** So it is ultimately your responsibility—

**Mr Jeffrey:** It is my responsibility—

**Q128 Mr Bacon:**— to appoint a Senior Responsible Owner?

**Mr Jeffrey:** If I could go back to what the Air Vice-Marshal was saying—

**Q129 Mr Bacon:** I would rather you did not. I just want to find out whose responsibility it is to appoint a Senior Responsible Owner. Ultimately it is your responsibility?

**Mr Jeffrey:** It is.

**Q130 Mr Bacon:** So if a Senior Responsible Owner is not appointed it is your responsibility that an SRO is not appointed?

**Mr Jeffrey:** Correct.

**Q131 Mr Bacon:** That is what I wanted to establish. It says in the Report that you are going routinely in future to appoint SROs. Is that right?

**Mr Jeffrey:** It is, yes.

**Q132 Mr Bacon:** The Report refers to the Assistant Chief of the General Staff's role, where it says, "Many stakeholders came to assume that the Assistant Chief of the General Staff had taken on that role", of being Senior Responsible Owner, although, "He has neither funding nor managerial authority for the Bowman CIP programme. . . . The Assistant Chief also has many other important responsibilities that prevent him from devoting extensive time to any single equipment programme. He has been supported by a Directorate . . .". It goes on to say, and this is in paragraph 2.8, "The Directorate does not have direct budgetary responsibilities, nor is it resourced to act as a programme office". That is talking about you, General Rollo, is it not?

**Major General Rollo:** Yes.

**Q133 Mr Bacon:** Did you make it clear to those who had come to assume that you were the SRO that in fact you were not? Did you go round saying, "I am not the SRO"?

**Major General Rollo:** I did.

**Q134 Mr Bacon:** You did? What sort of response did you get?

**Major General Rollo:** That it would be looked at, is the answer, but it did not stop what I was doing, which was to co-ordinate all the other things that needed to happen to bring the equipment into service, nor did it stop the project team leader, who was responsible for Bowman, from doing his work.

**Q135 Mr Bacon:** Thank you. Mr Jeffrey, on page 3 it says, "The role of Senior Responsible Owner requires both the authority that comes with senior

rank and sufficient time to effectively discharge the onerous responsibilities. It would be unusual to find individuals in the Department with both". It makes it sound as if it is too difficult to appoint a Senior Responsible Owner so you are not going to bother, but that is not the Department's position, is it?

**Mr Jeffrey:** No, it is not. I think the time issue is potentially a misleading one. My own view of the Senior Responsible Owner function is that it is important to identify somebody who is sufficiently senior to carry authority and who is well placed in the Department with a good view of all the various strands of activity that need to be brought together. The fact that that person may have other things to do is not the most important consideration. Obviously, the job needs to be properly weighted but it is more important to get somebody who is well placed and senior and authoritative.

**Q136 Mr Bacon:** Let us move on to the question of the weight. On page 46 it talks about the sequence of events, with the infantry remaining repeatedly clear that Bowman was not suitable. The first reference is to a letter from Headquarters Infantry to the Bowman Digitisation Military Team in November 1998 where it says, "The bottom line is that whatever happens we can not accept a portable radio that is bigger than its predecessor . . . The role and method of operation of the infantry make weight and volume critical factors . . . More radio means less ammunition means more casualties". If you continue through that appendix there are other similar references right up to 2000–05 on page 47, where it continues to say that there was a continued exchange of views but with no resolution. "In 2003, the Director of Infantry was still making clear his view that the weight was excessive: The PRC 354 is not acceptable for use in Dismounted Close Combat in its current form". Yet it says in paragraph 2.13 on page 19, as Mr Williams quoted, "The Department has agreed that General Dynamics UK has supplied what it was asked to . . .". You just ignored the infantry in there, did you not?

**Mr Jeffrey:** We touched on this earlier and I certainly accepted then and accept now that we did not get this completely right. Having said that, I do believe that efforts were made to produce a radio which was both consistent with the radio requirement and within the weight that the Army were looking for for this very specific purpose, but that is the point on which the Committee touched earlier and I do not know whether Dr Watson would like to add to what I said earlier.

**Dr Watson:** Merely to continue the theme that I opened before. There was no ambiguity here. The man who owned this was Air Vice-Marshal Butler's predecessor. His decision was absolute and it was that we pursue the performance of the radio as a radio. It is unambiguous.

**Q137 Mr Bacon:** What was his name?

**Dr Watson:** The predecessor?

**Q138 Mr Bacon:** Yes.

**Dr Watson:** The predecessor was in this case Air Vice-Marshal Dalton at that time.

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**Q139 Mr Bacon:** And he said, “Go ahead”?

**Dr Watson:** Yes.

**Q140 Mr Bacon:** “Worry about the radio, do not worry about the other issues”?

**Dr Watson:** No, he did not say, “Go ahead, worry about the radio, do not worry about the weight”. He said, “Do the best you can. The priority is to get the radio performance right”.

**Q141 Mr Bacon:** I understand, and, “Sod the poor bloody infantry”, basically?

**Dr Watson:** No, “Do the best you can”. Remember, the infantry in Iran and elsewhere—

**Q142 Mr Bacon:** Iran?

**Dr Watson:** Sorry, in Iraq.

**Q143 Mr Bacon:** There have been intelligence reports that there are several there. Are you confirming that?

**Dr Watson:** No, I am not.

**Mr Jeffrey:** It has been quite a long session and things may have been happening while we have been sitting here.

**Dr Watson:** Remember that as far as radio communications are concerned all of the infantry now have a personal role radio which has dramatically improved their ability to fight in close battle. There is a partial replacement of this functionality by the personal role radio which you will see in all the photographs of our troops in action.

**Mr Jeffrey:** Could I just cut in if you will allow me, Mr Bacon, and comment a little further on this? I understand your desire to personalise it but the decision—

**Q144 Mr Bacon:** It is not that I want a flaming effigy of anybody, although sometimes you wonder whether it would not be a bad idea, but it never seems to happen: nobody ever seems to take responsibility. The G3 civil servants who made the decision that the avionics for the Mark 3 Chinook were not going to be analogue or digital but, “Why do we not have both?”, and did not check that it would not fit inside the Chinook cockpit, which means that we still have eight Chinook helicopters at a cost of £259 million sitting on the ground in England when our forces need them in Afghanistan. Do not tell me that is not putting lives at risk, because it is. He was never named, was he? He went off into a happy retirement. Nobody ever takes responsibility for these things individually.

**Mr Jeffrey:** I have a lot of sympathy with that general point. The point I was going to make was that in the position we were in, in 2005 we faced a dilemma. As a Department, whether it be in the shape of Air Vice-Marshal Butler’s predecessor or otherwise, we were confronted with a situation in which, for one reason or another, we had produced a compliant version of the radio which met our requirements but was overweight for this particular purpose within the Army, and the judgment was

whether to carry on for as long as it would take, delay the deployment of that version until we had got something that was less heavy, or to deploy it and get all the benefits that we are now getting from it and set in hand a separate stream of work to develop something that would be light enough to be used and be fit for purpose. For better or worse, the decision that was made within the Department was that the second of these courses was the least bad and was the better one to take.

**Q145 Mr Bacon:** I would like to pursue this question of things that fit because the Chinook example makes the same point in a different way. I am in the process of refurbishing our house in Norfolk, and I got a tape measure and I measured the distance from the wall to the lavatory and a bath is going to go between the two. We have two bathrooms and they are going to have different width baths. One is wider, in the second bathroom. The one in the space I have just described is narrower. Do you know why it is narrower than the wide bath in the other room, Mr Jeffrey?

**Mr Jeffrey:** Because the space is no doubt narrower.

**Q146 Mr Bacon:** That is right: it would not fit, but I got a tape measure and I measured it and I saw that it would not fit. You said earlier, did you not, that there should have been a larger survey of the population of such vehicles but there was not. Somebody should have gone into the cockpit and got out a tape measure and said, “Hmm, it is that size”, or whatever size it was, but they did not. Whose responsibility is it in these procurement programmes to do the survey that you just described and make sure that whatever it is that is being developed, in this case Bowman, fits, because to a layman—and I am a layman; I served with some indistinction or lack of gallantry in the Territorial Army but I consider myself a layman in this—it is obvious: you go and measure it. Whose responsibility is it to go and measure it?

**Mr Jeffrey:** In the case we are discussing today, as I said earlier, the miscalculation that was made, and I am not pretending for a moment that it was not a miscalculation,—

**Q147 Mr Bacon:** Whose responsibility is it to go and measure it?

**Mr Jeffrey:** As I understand it, we provided the company with a variety of examples of Army vehicles—

**Q148 Mr Bacon:** You are not blaming the company because the NAO Report you signed says that the Department agrees that the company supplied what was required.

**Mr Jeffrey:** It was the Department’s responsibility and, as I said earlier, it would have been better—

**Q149 Mr Bacon:** What I am asking is whose responsibility was it? Not the Department but the Ministry of Defence has, I think, 103,000 civil servants; it may be less than that now, and I think



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you have got 180,000 military personnel, or is it the other way round? I cannot remember. I am not really interested in an answer that says there are 290,000 people all of whom were responsible for going and getting out the tape measure. I want to know whose responsibility was it to go and measure?

**Mr Jeffrey:** I cannot answer that question in terms of an individual. It was a complex programme.

**Q150 Mr Bacon:** All right, so in terms of a position, in terms of an office holder, in terms of a post, whose responsibility was it to go and measure, or to ensure that a measurement was made?

**Dr Watson:** I was the IPT leader at the time this was done.

**Q151 Mr Bacon:** IPT standing for?

**Dr Watson:** Integrated Project Team. It was therefore my responsibility to ensure that these measurements had taken place. We did a large number of measurements. Most of what we are talking about here as problems are caused by rather more subtle situations. There were some dimensional variances, and indeed there is a graphic picture of a couple of the issues. Many of the vehicles we are talking about were subject to local modification. Life was like that and therefore that was what was done to some of these older vehicles in order to make them best fit for the current operations. The only way of dealing with this particular problem in hindsight would have been to undertake, immediately before conversion, a 100% survey of the entire fleet. It would have been enormously time-consuming and very expensive. Even then the consequence of doing that survey would have been to influence, for example, the fitting equipment that was used, the length of cables, things of that sort, so there was a significant time lag associated with that.

**Q152 Mr Bacon:** I have run out of time so I will just ask one quick question finally and that is about the total cost. It is £2.4 billion for the programme. The DVD which General Dynamics sent us said that there are now 18,000 platforms, which I take to mean 18,000 units of this kit, in various places, be it on a Warrior or a tank or whatever. How many units will there be in total and what will be the average unit cost?

**Mr Jeffrey:** I do not have the answer to that.

**Q153 Mr Bacon:** If I take £2.4 billion and divide it by 18,000 I get £137,000 per radio. It sounds a bit pricey to me and I am obviously missing something. How many units are there going to be?

**Mr Jeffrey:** There is a larger number of units in which the radio will be deployed. Do you have that figure immediately to hand?

**Chairman:** If you cannot say now, give us a note.<sup>10</sup>

**Mr Jeffrey:** That is all right.

**Q155 Chairman:** I have got no further questions for you, Mr Jeffrey, but I would like you to do me a note on friendly fire, in which I have a particular interest, because we have lost the capability from Bowman now and we have got some loss of capability on international interoperability, so I want you to do a note to reassure me that there is no increased likelihood of friendly fire in the future.

**Mr Jeffrey:** We can certainly do that. Even as far as we have gone with Bowman we have made some improvement in the friendly fire position but I know of your very long-standing interest in it and we will provide a fuller note.<sup>11</sup>

**Q156 Chairman:** Before we finish, as we have here somebody who has got a lifetime of experience of the MoD, both inside the Department and inside the National Audit Office, I would like Sir John to comment on whether he thinks the MoD are getting better at procurement.

**Sir John Bourn:** I think the Ministry of Defence have the potential to get better at it. The projects that work well have three main characteristics—and there are some of them, although, almost inevitably, they are not the ones that get publicity and are not the ones that we bring to you in specific Reports. The three things you have to get right are first of all to have enough up-front money to know the technology and to take the risk out. As the Permanent Secretary has said, there has been in the Ministry a climate of optimism and you can understand why that is so. Nonetheless a heavy price has been paid for that optimism. The second characteristic is to plan and manage the project on a through-life basis, to recognise that the feasibility, research, development, production, bringing it into service, maintaining it, developing it and finally disposing of it is a continuing process but you do need to have a set of people whose careers are mainly bound up in it and who have a lifetime's experience of it. When you get those characteristics you find that overwhelmingly it works. Thirdly, within that system of long term lifetime project management I think you do need a Senior Responsible Owner, you do need somebody who is manifestly and obviously in charge. That person may have to collaborate with others but it should be a man or a woman you can point to and say, "It is down to you to get this right. If you find that you have not got the money raise your hand, if you find that it is too difficult raise your hand, but do those things early. Do not hug the problem to yourself and hope it will go away". Implicit in that system of a Senior Responsible Owner is an integrated project team which is based on trust and communication, both with the people inside the Department and with the people in the contractors. We have done some work on this which Tim Banfield has led and you see that the project teams where there is trust, where the people say what they think to each other, where they share their difficulties with each other, work. Where those elements are absent you get difficulties and

<sup>10</sup> Ev 21–22

<sup>11</sup> Ev 22

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**Mr Bill Jeffrey CB, Major General Bill Rollo CBE, Air Vice-Marshal Stuart Butler, Ministry of Defence and  
Dr Iain Watson, Defence Procurement Agency**

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problems, you get acrimony and you get people blaming each other. All those requirements are set out in the procedures of the Ministry of Defence. You can look at the manuals and they are all there, "This is how to behave and this is what to do". Increasingly I think the Ministry does do this but, sadly, it is still the case that it does not do it across the waterfront. It is the Permanent Secretary's ambition, as it has been the ambition of his predecessors, and you can go right back. The first reports of the Exchequer and Audit Department on military procurement are not all that different from what you have today. Even in the 19th Century, when you were trying to produce what would now be seen as the simplest artillery, it cost more, it came in late, it did not work as people had expected. Those pressures, of course, a lot of them, come out of the desire to have it quickly and to have it at the leading

edge of technology combined with the fact that there has never been enough money (except for one or two programmes) to do that. Chairman, I think that to get it right you need enough up-front money to get the technology right and the risks out, to plan and manage it on a through-life basis, to have an integrated project team and a Senior Responsible Owner who works on trust within and outside the Department.

**Q157 Chairman:** Thank you very much, Sir John, and, of course, gentlemen, you accept all that, do you not?

**Mr Jeffrey:** I accept every word of that and I think that at our best we are consistent with that but, as Sir John says, our best is not what we do all the time and the challenge is to make sure that it is.

**Chairman:** Good; thank you very much.

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### Memorandum submitted by the Ministry of Defence

Since it is now some time since the publication in July of the National Audit Office Report on the delivery of digital tactical communications through the Bowman CIP programme, I felt it might be helpful to the Committee to have a short note ahead of the hearing on 1 November, with an update on the current position.

As you will know, we have been introducing and integrating the new capability incrementally, as it becomes available, and the equipment is currently fielded in deployed operations in both Iraq and Afghanistan. This has been challenging, but the evidence we are receiving suggests strongly that Bowman equipment is having a positive effect. For example, the contribution made by secure long range communications using Bowman High Frequency radios and the ability to track convoys using the Bowman situational awareness capability is significant. It is important to bear in mind that the Brigade which was until recently deployed to Afghanistan (16 Air Assault Brigade), like its counterpart in Iraq (20 Brigade), has not been through the full Bowman conversion and training programme (known as Bowmanisation), although they were trained to use the Bowman capability provided. It is perhaps not surprising, therefore, that some issues have emerged. These brigades represent an early stage of Bowman deployment on operations and we can expect that familiarity, confidence and the ability to exploit the system will increase over time. But the overall assessment is that the Bowman equipment of these brigades enabled them to do things that would not have been possible with the Clansman radio system and the net result has been to enhance operational capability. Bowman has proved itself to be adaptable, capable and effective and, while there remain areas for further development as the system continues to evolve, it is proving its worth on operations now.

Three Commando Brigade, which is taking over from 16 Air Assault in Afghanistan, is fully Bowmanised. 20 Brigade's successor in Iraq, 19 Brigade, is not Bowmanised but will use Bowman equipment and will have under command two Bowmanised battlegroups. It will therefore have a higher level of Bowman capability than its predecessor. Both 20 Brigade and 16 Air Assault Brigade are due to enter Bowman conversion on their return from operations. We expect successors to 3 Commando and 19 Brigades to be Bowmanised.

The longer term success of the Bowman CIP programme depends on the recast programme which resulted from the decision in 2005 to stop advancing along the original line, to conduct a root and branch review and adopt a new plan that recognised the challenges that had emerged. The recast programme is contractually committed and fully underway and both the Department and the contractor, General Dynamics UK, are working with great commitment to complete the Bowmanisation programme to convert and train the remaining Army units and convert naval and air platforms and to deliver the next increment of Bowman CIP capability in 2007. On conversion, momentum is being maintained despite operational commitments and the need to address Urgent Operational Requirements which may ultimately impact on timescales. Production line capacity has increased steadily. There are now fewer than 6,000 vehicles to go and most of these are of less complex type. Further trials and testing have increased confidence that the technical risks remaining in the recast programme will be overcome. In particular, the High Capacity Data Radio, the fundamental element of the tactical internet on operations, proved itself to be a thoroughly reliable mobile system in detailed testing conducted in May 2006.

### Memorandum submitted by General Dynamics United Kingdom Limited

The Comptroller and Auditor-General published his report on the Bowman CIP programme in July 2006, and General Dynamics UK welcomed the Report as a fair and reasonable view of the programme. General Dynamics UK cooperated fully with the NAO team to provide all the information they requested.

As Prime Contractor and Systems Integrator for the Bowman CIP programme, General Dynamics UK is integrating digital voice and data technology to provide secure communications and tactical internet services on land, sea and air. The programme has delivered secure voice communications and key capabilities on time, meeting its contractual In Service Dates and key requirements.

General Dynamics UK welcomes the fact that the National Audit Office (NAO) highlighted how Bowman is already being used with great success on operations. It is providing our Armed Forces with faster, secure and more reliable communications, together with advanced situational awareness in the field.

The NAO has acknowledged the progress made by General Dynamics UK and the MoD, working as partners to make Bowman CIP a success story since the re-competed programme was awarded in 2001. The report recognises the immense scale of the task: converting 15,700 vehicles, 141 naval vessels, 60 helicopters and tens of thousands of individual radios from the analogue into the digital era. This is the biggest step change for the Army since mechanisation, and it is being delivered successfully to a very challenging timescale:

#### KEY DATES

- July 2000—the MoD re-launched the Bowman programme after losing confidence in its existing contractor.
- September 2001—In the new competition, General Dynamics UK was selected to deliver Bowman and signed the new contract.
- March 2004—The Bowman In-Service Date was met on time, within a very challenging 30-month timescale.
- December 2004—Initial acceptance was declared for CIP, with its In Service Date subsequently declared in March 2006, with effect from December 2005.
- April 2005—Initial elements of Bowman were deployed to Iraq with 12 Mechanised Brigade.
- November 2005—7th Armoured Brigade deployed to Iraq as the first fully Bowmanised Brigade. In the same month, 3 Commando Brigade of the Royal Marines trialled Bowman successfully in Amphibious Exercise Bowman Vanguard, leading to operational readiness in Littoral (coastal) environments being declared as planned in December 2005.
- February 2006—Acceptance for Apache Bowman Connectivity (ABC) was achieved, and the In Service Date for Secure Voice Rebroadcast capability was declared with effect from May 2005.
- May 2006—successful trials took place for the Platform BISA (P-BISA) and High Capacity Data Radio in the field, with the latter demonstrating a 99% success rate for large messages on a 120-node network (a brigade-sized formation).

Bowman CIP is the cornerstone of the tactical communications and information infrastructure of the UK Armed Forces. The NAO recognises that this is an evolving programme as we continue upgrading and enhancing its capabilities over a 25–30 year lifetime. By its very nature, Bowman CIP is capable of successive insertions of technology and software to take account of changes in doctrine, evolving requirements, and experience learned on operations.

All NAO reports rightly and properly identify ways to improve future programmes. General Dynamics UK has already proved willing to engage constructively with emerging issues, working in partnership with the Ministry of Defence to deliver the best outcome for our Armed Forces and the taxpayer. We are looking at all the NAO's suggestions in the same positive manner.

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### Supplementary memorandum submitted by the Ministry of Defence

Question 153 (Mr Richard Bacon): *Unit Cost of Bowman CIP System*

While the costs of the Bowman CIP programme can be broken down in a number of different ways, the complexity, diversity, range and scale of re-equipping activity make it difficult to arrive at a meaningful average figure. Against this background, the figure which perhaps best illustrates the broad average of costs per unit can be derived from taking the overall cost of the Bowman CIP programme of around £2.5 billion including VAT and dividing it by the number of radios being delivered (around 48,000). This gives an average cost figure per radio installation of about £52,000. It should be borne in mind that this figure reflects all relevant programme costs, such as design and development of equipment and software, conversion/

fitting, initial support, training, cost of capital charges and supply of all equipment elements. By way of comparison, the cost of a bare High Frequency (HF) radio on its own is in the region of £13,000 but this would provide no military utility.

Question 155 (Mr Edward Leigh): *Detailed Description of the Improvements that the fielding of Bowman on operations brings to Combat Identification*

As regards the impact on Combat ID capability, Bowman CIP is among the systems that contribute to such capability by improving situational awareness. Prior to the deployment of the Bowman CIP capability in 2005, the Clansman radio system provided insecure voice with cumbersome off-line encryption and little ability to handle data. The initial version of Bowman CIP currently in service provides a greatly improved secure voice communications service and a basic data handling capability that can distribute GPS derived positional information. As a result, a limited situational awareness picture can be put onto digital maps located in command posts, and with secure voice interoperability, situational awareness information can be passed to and from Allies using common secure voice networks. This capability is enhanced by well practised tactics, techniques and procedures developed through operational experience with Allies, and together will help to reduce the risk of incidents of fratricide in the future.

The capability increment to be delivered from next year (Bowman CIP 5) will build on this substantially by providing better situational awareness at the tactical level, enabling a robust, frequently updated electronic map showing the position of units to be delivered to all UK command posts, armoured vehicles, many non-armoured vehicles and specialist dismounted users. In addition to secure voice interoperability with Allies, it will provide secure data interoperability in the form of standard formatted messages or e-mail that can be passed to other nations with systems conforming to the relevant NATO standard. An electronic picture, partly generated by Bowman CIP, of UK land forces can be passed via high level national systems to Allies, although it cannot include all the tactical detail available from Bowman CIP. This snapshot in time will contribute to Coalition situational awareness and will help Coalition operational level planning.

The multilateral interoperability data exchange capability referred to in paragraph 4.9 of the NAO Report on Bowman CIP would allow Bowman CIP data to be transferred directly to Allied systems that conformed to the relevant multinational standards. But there would still be latency and some loss of detail so it could not provide complete real time UK situational awareness to Allies. The ability to pass Bowman CIP tactical situational awareness information to US systems (and vice versa) has been demonstrated to be technically possible through the Coalition Blue Force Situational Awareness (CBFSA) demonstrator. This work will primarily inform and de-risk future programmes including development of Bowman CIP capability but could also be the basis of a future operational capability in conjunction with Bowman CIP 5.

The short point is that although Bowman CIP is only one of a number of steps we are taking to improve Combat ID, it is already making a significant contribution and is likely to do more.

ISBN 978-0-215-03290-4



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