Appendices and Glossary

Appendices:

A: Timeline of events

B: Key underlying evidence

Glossary

Appendix A: Timeline of events

1. This Appendix sets out the timeline of events relating to the development of the Airwave network. It draws primarily on publicly available information in the NAO reports.[1] Developments in relation to ESN have been highlighted to the extent that these provide relevant context to the supply of the Airwave network.

Date	Airwave	ESN
July 1995	Publication of the Prior Information Notice by Home Office regarding a radio network for the emergency services. 70 companies expressed an initial interest in response to this.	
January 1996	Project Notice published in the Official Journal of the 1996 January European Communities. 3 bidding consortia were formed in response to this.	
April 1997	Consortium led by BT[2] (supported by Motorola and Nokia) left as the single bidder	
October 1997	BT awarded a contract for a project definition study, which was completed in September 1998	
December 1998	Commercial negotiations with BT started	
October 1999	BT submitted its best and final offer	
February 2000	BT and PITO signed the PFI Agreement	
April 2000	Airwave Solutions was incorporated	
September 2001	Roll-out of Airwave network commenced	
April 2002	1st NAO report published	
July 2005	Ambulance trusts in England and Wales signed contract with Airwave Solutions	
March 2006	Fire and Rescue Services signed contract with Airwave Solutions	
July 2006	Scottish Ambulance Service signed contract with Airwave Solutions	
2007	Infrastructure funds managed by the Macquarie Group bought Airwave Solutions	

[1] NAO Public Private Partnerships: Airwave report, 2002; NAO: Upgrading emergency service communications: the Emergency Services Network (2016); NAO 2019: Progress delivering the Emergency Services Network.
[2] Through its subsidiary, O2. In November 2001, BT demerged its mobile communications businesses, including the Airwave contract, into a separate company, O2 plc.

Date	Airwave	ESN
	OFT cleared Macquarie/Airwave merger in August 2007	
2010	Airwave Solutions became a strategic supplier to government. Negotiations with the Cabinet Office to secure discounts were unsuccessful	
2011		Emergency Services Mobile Communications Programme (ESMCP) set up to look at options to replace the Airwave network
April 2014	Discussions to extend Airwave contracts held with Macquarie, but officials did not secure a discount considered sufficient	Home Office launched tender to replace the facilities provided by the Airwave network with ESN
September 2015		ESN Lot 1 contract with Kellogg Brown and Root (KBR) signed
December 2015	Motorola signed SPA to purchase Airwave Solutions from Macquarie	Motorola signed Lot 2 contract to provide services to ESN EE signed Lot 3 contract to provide services to ESN
February 2016	Motorola completed the acquisition of Airwave Solutions from Macquarie on 19 February Home Office and Motorola agreed DoR Airwave contracts extended to December 2019. They were originally due to expire between September 2016 and May 2020	
July 2016	CMA cleared Motorola/Airwave merger	
September 2016		2nd NAO report published
2017	Transition of users from the Airwave network to ESN initially scheduled to start October 2017	Motorola acquired Kodiak Networks in August 2017. Kodiak is the owner of the push to talk system to be used in ESN
September 2018	Airwave's contracts extended by an additional three years to December 2022 A common National Shut Down target date of December 2022 was agreed	Home Office announced the reset of ESN programme on 21 September 2018
May 2019		3rd NAO report published
May 2021	Home Office opens negotiations with Motorola around extension of Airwave contracts	
December 2022	Current end date for Airwave's contracts	Current date for completion of transition and ESN replacing Airwave network
December 2023		Current end date for ESN contracts
December 2026	NAO in 2019 estimated that under a potential 'near worst-case' scenario, the Airwave network shut-down could be delayed by four years to December 2026. In June 2021, the Home Office told the Public Accounts Committee that December 2026 was the new target date for transitioning to ESN	

Appendix B: Key underlying evidence

Introduction

1. This Appendix provides an overview of the key facts and our understanding of the market for the provision of a secure mobile radio network to emergency services in Great Britain and its evolution over time.

Contractual arrangements relevant to Airwave

2. Airwave Solutions[1] provides radio communications services under a number of contracts (referred to as the Airwave Contracts) namely:

   (a) contracts with the Home Office, comprising the PFI Agreement entered into in 2000 and associated services contracts,
   (b) the Firelink contract with the Department for Communities and Local Government (later transferred to the Home Office) entered into in 2006,[2]
   (c) the ambulance contract with the Department of Health entered into in 2005,[3] and
   (d) the Scottish ambulance contract with the Scottish Ambulance Service Board entered into in 2006.[4]

3. These contracts were originally due to expire between September 2016 and May 2020, with the latter being the expiry date for the PFI Agreement.[5]

4. In 2016, when Motorola purchased Airwave Solutions, a number of contract extensions were agreed between the above contracting authorities and Airwave Solutions such that all Airwave Contracts had a common end date of 31 December 2019.[6]

5. In December 2018, a second set of contract extensions were agreed between the above contracting Authorities and Airwave Solutions extending the end date for the Airwave Contracts to December 2022 (i.e. the National Shut Down target date for the Airwave network).[7]

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[1] Previous company names for Airwave Solutions are: BT Wireless Limited (2000 – 2001); BT Sixty-Six Limited (2001); Airwave O2 Limited (2005 – 2007); and Airwave Safety Communications Limited (2007).
[2] Firelink extends their contract with Airwave - TCCA. Humberside FRS Airwave_Policy
[3] https://www.computerweekly.com/news/2240074779/O2-Airwave-wins-national-ambulance-deal;
[4] https://www.zdnet.com/article/scots-ambulances-get-48m-airwave/
[5] NAO Report (2016) - Upgrading emergency service communications the Emergency services Network, paragraph 4.2.
[6] NAO Report (2016) - Upgrading emergency service communications the Emergency services Network; paragraph 2.18.
[7] NAO Report (2019) - Progress delivering the Emergency Services Network, paragraph 1.22.

6. The Home Office is required to give Motorola 12 months' notice of its intention to shut down the Airwave network.[8]

7. The Home Office has started initial discussions/negotiations with Motorola regarding an extension of the Airwave Contracts, and it is now expected that the Airwave network will be shut off no sooner than late 2026.[9] In 2019, the NAO had estimated that the Airwave shut-down could be delayed by four years, from the current date in the Airwave Contracts of December 2022, to December 2026. NAO also estimated that a 12-month extension of the Airwave network could cost the taxpayer an estimated £475 million.[10]

Private Mobile Radio

1995 – 2000: TETRA-based dedicated network for emergency services

8. This section describes the process of procuring a national radio network for the emergency services between 1995 and 2000 and draws on the NAO 2002 report into the Airwave network.[11]

9. Historically (prior to 2000), each police force was responsible for the procurement and maintenance of its own radio communications systems. Many of these systems did not meet operational requirements and prevented each police force communicating easily with other emergency services in its area or with its neighbours.[12]

10. Based on a major review of radio communications in the Police and Fire Services, the Home Office concluded that a new system was required and that it should be procured on a national basis. This new system should be shared by the police and fire services, as well as other public safety organisations, if their requirements were met and it was cost effective.

11. The process of procuring a national radio network for the emergency services started in 1995 and was led by PITO, a Non-Departmental Public Body (which used to be part of the Home Office).

12. At the start of the procurement process, conditions seemed to be set for a fully competitive procurement. 70 companies expressed an initial interest in

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[8] NAO Report (2019) - Progress delivering the Emergency Services Network, Figure 10.
[9] Motorola Solutions CEO anticipates extension of Airwave contract in UK by end of year – Urgent Comms; UK officials revamp ESN plans again, target Airwave-to-LTE transition for end of 2026 – Urgent Comms; Transition from Airwave to ESN Likely Won't Happen Until 2026, U.K. Official Says (rrmediagroup.com).
[10] NAO (2016); paragraph 2.18.
[11] NAO Report (2002) - Public Private Partnerships: Airwave.
[12] NAO Report (2002) - Public Private Partnerships: Airwave, paragraph 1.

the project in response to a Prior Information Notice published in the Official Journal of the European Communities in July 1995.

13. Three potential bidding consortia were formed after the publication of the project advertisement in January 1996. These three consortia passed a pre-tender assessment, but two decided to merge to produce a stronger bid. Later on, the merged consortium dropped out following the withdrawal of one of its key technical partners. This left the consortium led by BT[13] (supported by Motorola and Nokia) as the sole bidder.

14. The NAO identified some factors which reduced the number of potential bidders:

(a) The decision to adopt the TETRA[14] standard required potential bidding consortia to include companies committed to the development of what was, at the time, an emerging technology. From this small supplier base, the BT-led consortium included two of the key companies leading the development of TETRA technology.[15]

(b) Only a few companies had the financial strength to take on a large project to build and operate a national radio system across Great Britain. The cost of bidding was also significant. In 1994, the cost to each bidder of undertaking a study was estimated at £500,000; by 1996, quoted figures for this work ranged between £2.5 million to £10 million. Such an investment in the project was, for two consortia, too risky.[16]

(c) Uncertainties about whether all of the emergency services would participate in the project. Even when the scope of the procurement was reduced to the police, there were still many stakeholders whose agreement had to be obtained.

15. As existing radio systems were not meeting operational requirements, 'do-nothing' was not considered an option and the solution had to avoid delaying implementation of a new service. After wide consultation, PITO concluded that continuing with BT as a single bidder posed the least risk of delay.

16. In the absence of competition, PITO carried out a number of actions:

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[13] In November 2001, BT demerged its mobile communications businesses, including the Airwave contract, into a separate company, O2 plc.

[14] Terrestrial Trunked Radio (TETRA) is a set of standards developed by the European Telecommunications Standardisation Institute that describes a common mobile radio communications infrastructure across Europe.

[15] Ericsson Limited and Bosch Limited who were in Consortium 2 moved away from TETRA technology in 1996.

[16] PITO initiated discussions about the possibility of reimbursing some of the costs of carrying out the project definition studies but, without being able to establish how much funding would be made available to bidders, PITO was unable to use this to maintain suppliers' interest in the project.

(a) Acting on a suggestion by BT, PITO tried to strengthen its negotiating position with the use of a 'should-cost' model. This model was expected to provide an understanding of the costs of delivering the service and permit direct comparisons with, and challenges to, BT's estimated costs. To estimate BT's costs, specific information over the duration of the contract was required but difficulties were encountered. For instance, reliable cost information for equipment proved not to be readily available because the technology was new. Nevertheless, the should-cost model was used to challenge BT's costs and both PITO and BT considered that prices had been reduced as a result of these discussions.

(b) The cost of Airwave was compared to a public sector comparator, where the comparator estimated the cost that would have been incurred if the public sector were carrying out the same project to the same specification as the Airwave network. The NAO's examination of the public sector comparator indicated that its value was limited by a number of factors. The public sector comparator was not prepared until 1999 when negotiations with BT were at an advanced stage. PITO considered that the comparator helped with the assessment of value for money but added nothing to the decision on whether or not the PFI was the most appropriate procurement route.

(c) PITO planned to develop a fallback option in which the police forces, either individually or collectively as small regional groups, procured their own radio systems. The fallback was intended to discourage BT from exploiting its single bidder position. The overriding concern about this option was that the police forces would procure radio systems that were incompatible with those of neighbouring forces such that the goal of obtaining a national service would be lost. In any event, PITO started preparing a fallback in June 1997 but had to halt work in August 1997 because of a lack of resources. Work did not restart until late 1998, after the Association of Chief Police Officers expressed concern about the lack of a fallback if forces did not accept the Airwave network. This work was however not taken further because resources were again not available. If the implementation of the Airwave network had failed, it would have been the only realistic option for police forces.

17. In February 2000, a framework arrangement under a PFI was signed under which BT would design, build, finance and operate a secure private mobile

radio network (later to be called the Airwave network) for police forces throughout Great Britain.[17]

18. Airwave Solutions was incorporated in 2000 to build the Airwave network.[18] Under the PFI, Airwave Solutions would design, build and operate the fixed assets used to transmit and receive voice and data signals. The total cost of the Airwave network during the 19 years in which the framework arrangement was expected to be in place was expected to be around £1,470 million.[19]

19. Today, the Airwave network (now owned by Motorola) is the only secure nationwide communications network for emergency services and blue light organisations (i.e. ambulance, police, and fire departments) and sharer organisations[20] who want to work closely with these organisations in Great Britain.

20. The Airwave network is based on TETRA technology and Airwave Solutions is restricted by its licence to offer services on the Airwave network to the British emergency services. Around 470 public organisations (107 emergency services and 363 other public sector organisations) use the Airwave network.[21]

Mobile/4G Technology

2010 – 2019: Mobile-based technology for shared use

21. In 2011, the government set up the Emergency Services Mobile Communications Programme (**ESMCP**) to look at options to replace the Airwave network when the contracts expired (in 2019).[22]

22. The programme considered two technological approaches in its outline business case finalised in December 2013:

    (a) using radio-based technology (such as TETRA) on a network dedicated to the emergency services: This would involve either:

        (i) the programme renewing the existing Airwave contract; or,

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[17] Separate arrangements exist in Northern Ireland.
[18] Airwave Company Accounts 2019
[19] NAO Report (2002) - Public Private Partnerships: Airwave
[20] The list of sharer organisations is controlled and managed by Ofcom and includes those organisations who have a specific need to communicate with a blue light service. It includes organisations such as Coastguard Services, Environmental Agency Enforcement Officers, HM Prison Service, London Underground, etc.
[21] NAO Report (2019) - Progress delivering the Emergency Services Network, paragraph 1.3.
[22] ESMCP is part of the Home Office but is co-funded by the Department of Health, Scottish Government and Welsh Government.

(ii) asking the market to build a new radio-based network (Option 1)[23]; or

(b) using mobile-based technology (such as 4G): This would involve either:

(i) building a 4G network dedicated to the emergency services (Option 2), which the government could either own itself and pay someone to manage, or lease from a commercial owner; or
(ii) building a 4G network to be shared with other users (Option 3), where this would involve buying capacity on an existing commercial network and running special public safety functionality over the top.[24]

23. The government's chosen option to replace the Airwave network is known as ESN (Option 3 above). The strategic case for ESN outlined three principal drivers for change:

(a) contracts with Airwave Solutions were due to expire in May 2020;

(b) current contracts with Airwave Solutions did not represent the lowest cost for the taxpayer;[25] and

(c) the emergency services increasingly needed high-speed mobile data capabilities which Airwave could not support.

24. The government also had reasons which created a strong case for moving to ESN, including:[26]

(a) The government had limited leverage over Airwave Solutions: The government was unable to agree with Airwave Solutions a list of assets that it would own once contracts expired, and this limited the government's control over the use and cost of the assets in future. There was also no like-for-like competitor for Airwave Solutions for the government to turn to.

(b) Airwave Solutions had an undiversified business model: Most of Airwave Solutions' revenues, about 98% in 2015-16, came from selling its network

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[23] This option was the lowest-risk option but was considered "unlikely".
[24] This was the most beneficial and highest-risk option considered – as at 2016, no country was using 4G mobile technology for its emergency service communications, but all of the other options would have resulted in fewer benefits than the programme expects from ESN.
[25] Between 2010 and April 2014, Macquarie made various offers to reduce its price to the government but the government considered that these offers offered insufficient value. Home Office officials considered that Macquarie had every opportunity to submit a competitive price for the government to continue with the Airwave network and did not. A conscious decision was made not to negotiate with Airwave Solutions on a price for the period to 2032. NAO (2016) - Upgrading emergency service communications the Emergency services Network , paragraph 4.13.
[26] NAO Report (2016).

to the public sector. This meant that it had limited opportunities to make profits from other sources and offer a more competitive price.

(c) From 2010, the government had had a poor commercial relationship with Airwave Solutions: According to the NAO, in 2010, the Cabinet Office was approaching all its strategic suppliers and asking for discounts as part of the government's austerity initiative. Airwave Solutions, however, had not yet broken even on its investment in the network – this did not occur until December 2012. The government also believed that Airwave Solutions' owners had an unsustainable debt position, which limited its ability to offer significant discounts. The government was not willing to offer extensions in return for a discount and, without this, an agreement could not be reached. These discussions led to a deteriorating commercial relationship between the government and Airwave Solutions.[27]

25. ESN is therefore intended to deliver more competitive outcomes for the emergency services by replacing the Airwave network service with one that matches it in all respects and:

(a) has better mobile data capabilities and makes high-speed data more readily available to the emergency services to improve their performance;

(b) provides more flexibility to take advantage of new technologies as they emerge (e.g. integrated critical voice and broadband data services); and

(c) costs less and saves money by sharing an existing and enhanced commercial 4G mobile data network instead of building a dedicated private mobile radio network.

26. In April 2014, the Home Office launched a tender to replace the facilities provided by the Airwave network with ESN. Three lots[28] were issued to provide the relevant critical data services:[29]

(a) Lot 1 (delivery partner): was awarded to KBR to provide programme management, integration and reporting to assure the build of ESN and transition between 2017 and 2019 of users on to ESN;

(b) Lot 2 (user services): was awarded to Motorola in December 2015, to act as a service integrator to provide end-to-end systems' integration,

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[27] NAO (2016) - Upgrading emergency service communications the Emergency services Network , paragraph 4.3.
[28] The CMA understands that one lot was withdrawn by the Home Office.
[29] Home Office: About the emergency services network

manage user accounts, provide user services including public safety functionality; and

(c) Lot 3 (mobile services): was awarded to EE in December 2015 as a network operator to provide a resilient national mobile network.

27. Airwave's supply arrangements with the relevant British emergency services/ government departments was expected to terminate upon expiry of the relevant contracts and the last of these contracts was set to expire on or before 31 December 2019.

28. This did not happen due to various delays (see Section below) and the Airwave service was extended by three years to end in December 2022, with the option of extending the contract further.

2019 – Date: Delays in moving from TETRA-based to Mobile-based technology

29. Table 1 below (based on Figure 4 of the NAO's 2019 report) sets out how the timeline for the roll-out of ESN has been delayed over the last five years.

Table 1: Timetable for delivering ESN

Target date for:	*Outline business case* (December 2013)	*Full business case* (August 2015)	*Main contract award* (December 2015)	*When last reported* (August 2016)	*Current* (April 2019)
Main contract award	May 2015	October 2015	December 2015	December 2015	December 2015
Transition starts[1]	September 2016	July 2017	September 2017	September 2017	June 2020
Transition complete ESN replaces Airwave	March 2020	January 2020	March 2020	December 2019	December 2022
Time allowed for transition[1]	42 months	30 months	30 months	27 months	27 months

Source: Based on NAO, 2019, Figure 4.
Note: 1. Transition is the period during which the emergency services will start to adopt, test and use ESN instead of the Airwave network. Its anticipated duration is expected to be revised over 2019.

30. By 2017, the Home Office was publicly reporting delays of nine months in delivering ESN and commissioned an independent review, which identified five causes of delay:

(a) The failure of the delivery partner (KBR) to provide planning and collaboration between the other contractors after its role was downgraded "*effectively to one of a recruitment vehicle… to meet the contract price*".

(b) Motorola and EE had solutions based on different versions of the technical standards.

(c) Disagreement on the accountability for systems integration and technical design. For example, the Home Office and Motorola had not agreed the "true scope" of Motorola's role in integrating ESN systems "end-to-end".[30]

(d) Challenges in locking down the specification for software and user services. There was no effective process for signing off software developed by Motorola in a timely manner.

(e) Late delivery of the 'related projects', which the Home Office kept separate from the main contracts and controlled itself. These include the handsets and vehicle equipment that the emergency services will use, providing ESN on the London Underground and an air-to-ground service for helicopters and aeroplanes.

31. This independent review found that the transition from the Airwave network to ESN was not likely to happen on time and that the ESN programme needed to be reset. The Home Office announced the reset on 21 September 2018. An assurance panel was also set up in December 2018 to ensure that there was "one version of confidence".

32. During the period up to the reset, the Home Office had hoped to make Motorola responsible for aspects of technical integration, such as ensuring that user control rooms could be connected to ESN, and that Motorola and EE networks would integrate seamlessly. However, the 2017 independent review found that ambiguities in the contracts and a lack of attention to detail in procurement had allowed Motorola to disclaim such responsibility, and therefore the Home Office took on this role.

33. In a report by the Public Accounts Committee in 2019,[31] the Home Office admitted that its original timetable for ensuring ESN provides network coverage everywhere was too optimistic for a number of reasons:

(a) The Home Office was responsible for building 292 new mobile phone sites in rural areas and connecting them to EE's network, but only 2 out of the 292 had been finished.

(b) The Home Office had found getting the agreement of landowners more difficult than it had expected.

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[30] The original plans from Motorola and EE had made incompatible assumptions about how Motorola would implement push to talk functionality, which the Home Office did not identify before contracts were signed in 2015. As Motorola and EE shared designs, it became clear that each had based their designs on different versions of international standards. The Home Office's independent reviewer found that "…it took many months for the programme to properly comprehend the impact of the design mismatch".
[31] PAC (2019) - Emergency Services Network: progress review, page 8.

(c) EE had been slower than expected in rolling out the physical infrastructure needed to support ESN, including coverage for regional metros, which was at the time expected to be completed in 2020 rather than September 2017 as originally planned.

(d) EE had been over-optimistic about the time needed to build coverage into underground railways, such as those in Glasgow and Tyne and Wear. In other areas EE would have been able to deliver quickly if it had needed to, but delays elsewhere in the programme meant that it had deliberately spread out its investment over a longer period.

Motorola's relationship with Airwave Solutions

34. As noted, in paragraph 18, Airwave Solutions was incorporated in 2000 to build the Airwave network. The total cost of the Airwave network during the 19 years in which the framework arrangement was expected to be in place was expected to be around £1,470 million.[32]

35. In 2007, Guardian Digital Communications Limited (Guardian) acquired Airwave Solutions for £1.9 billion ($3.8 billion).[33] Guardian was a UK company ultimately controlled by Macquarie and Macquarie European Infrastructure Fund II (MEIF II). The Office of Fair Trading (OFT, one of the CMA's predecessors) reviewed this merger in 2007.[34]

36. As mentioned in paragraph 26, in December 2015, Motorola was successful in winning the Lot 2 (user services) contract to carry work on ESN.

37. In December 2015, Motorola entered into a Sale and Purchase Agreement (SPA) for the acquisition of Airwave Solutions (more specifically, 100% of the issued capital of its holding company Guardian). In 2016, Motorola completed its acquisition of Airwave Solutions for £817 million (~$1.2 billion).

38. The CMA reviewed this merger in 2016 and assessed the potential impact of the Merger in Great Britain in relation to: (i) the distribution of TETRA radio terminals; (ii) the supply of the Airwave network; (iii) the supply of Airwave testing services/facilities; and (iv) the manufacture for supply of TETRA radio terminals.[35] In its decision to clear the merger, the CMA noted that "*There are plans for customers to begin transitioning from the Airwave network to the new Emergency Services Network (ESN) (its replacement) in the final quarter*

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[32] NAO Report (2002) - Public Private Partnerships: Airwave
[33] https://www.reuters.com/article/idUSSYD29905720070419
[34] Macquarie/Airwave merger inquiry - Phase 1 Decision (2007).
[35] Motorola Solutions Completes Acquisition of Airwave | Motorola Solutions. See also Motorola Solutions Acquires Airwave For £817m (silicon.co.uk)

of 2017 and for the Airwave network to be switched off in December 2019 (although some short delay is possible). Because of this, it is likely that there will be very few sales of TETRA radio terminals in future." At the time, Motorola told the CMA that [✂].

39. As noted in paragraph 24, the government had a poor commercial relationship with Macquarie (previous owners of Airwave Solutions). In recognition of the commercial risks for the programme from Motorola being both a supplier on ESN and the main incumbent supplier, the Home Office programme officials agreed a number of concessions with Motorola when it acquired Airwave Solutions in 2016.

    (a) *Programme officials agreed a flexible basis on which Airwave can be extended, a firm price for this, re-use of some of Airwave's radio masts for ESN, and a simpler solution for working across ESN and the Airwave network during transition than had previously been planned.*

    (b) *The programme also negotiated a deed of undertaking to reduce the extent to which Motorola could benefit from delays in delivering ESN and thereby exploit its position*.

    (c) *The programme did also consider that this [the merger] should help with the overall delivery of ESN and both the programme and Motorola agree that the relationship between government and Airwave is now much better.*[36]

40. As part of the phasing-out of the Airwave network and the phasing-in of the new ESN, the UK government also entered into contractual arrangements with Motorola for it to assist with the provision of interoperability services between the two networks up until the Airwave network is scheduled to be switched off on 31 December 2019. This will facilitate communications between those regions which have migrated onto the new ESN and those which have not yet been migrated onto the new ESN.

41. It was anticipated that the interoperability service would enable Motorola to meet its deliverables to the UK government under the Lot 2 contracts without any unnecessary delay. It would also enable [✂].[37]

42. We note that Motorola's involvement with the Airwave network predates the above acquisition. From 2000, when the Airwave network was being built, BT (owner of Airwave Solutions at the time) bought TETRA infrastructure

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[36] NAO, 2016, paragraph 3.15.
[37] [✂].

equipment (including switching platforms and base stations) from Motorola for use by the Airwave network across Great Britain. Motorola also had people seconded to Airwave Solutions to help ensure the consistent operation of the Airwave network.[38]

43. For completeness, it is worth noting that:

(a) The CMA cleared a merger in 2017 in the downstream market (Sepura/ Hytera) and there is an on-going Ofcom CA98 investigation[39] involving Motorola and Sepura in relation to the provision of radios and associated services for use on the Airwave network. We do not consider these cases to be relevant to the present issues.

(b) In 2017, Motorola acquire Kodiak Networks for $225 million (£174 million). The purchase includes a push-to-talk system (generally referred to as Kodiak), which conforms to common industry standards and will be used as part of the ESN solution.

44. In 2019, the NAO issued a number of warnings about the commercial linkages between Motorola and Airwave and the potential for perverse incentives (including delays to ESN):

The Home Office needs to manage Motorola's contractual position carefully, given that it is both a main supplier to ESN and the owner of Airwave and may therefore benefit from programme delays.

The Home Office will need to manage carefully the commercial consequences of renewing Airwave before changes to the Motorola contract have been agreed. Motorola will benefit from the successful development of ESN, but it also receives large revenues from the continued use of Airwave.

Motorola owns several key components of the current and future emergency services communications systems… [It won the user services contract for ESN in 2015, purchased Airwave in 2016, and purchased Kodiak in 2017] … putting it at an advantage over any competitors when the ESN contract is renewed in 2024.

The Home Office will also need to manage any conflict of interests regarding Motorola's role in accrediting products for ESN to ensure fair competition, so emergency services are not tied to Motorola's products. Motorola is a control

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[38] Motorola/Airwave Phase 1 decision, paragraph 25.

[39] See: Competition Act investigation regarding the provision of equipment and related services in the electronic communication sector.

room vendor, potential supplier of handsets and vehicle devices and in charge of accrediting devices and control rooms for ESN.

45. In 2020, the Public Accounts Committee also issued comments on Motorola's incentives. It suggested that the Home Office had painted itself into a corner by extending its existing contract with Motorola – which is involved in both the new and the old contract – resulting in "*perverse incentives and putting the department in a weak negotiating position*". It noted that:

> "*Given its previous negotiation to extend Airwave achieved only a 5% discount, and given Motorola, which is a key supplier to ESN, has a monopoly position as Airwave's owner, we are concerned that the Department has limited leverage to secure value for money in any future extension of Airwave contract*".[40]

[40] PAC accuses ESN vendors of creating 'perverse incentives' (digitalhealth.net)

Glossary

Term / Acronym	Definition
AEC	Adverse effect on competition.
Airwave network	A secure private mobile radio communications network for organisations involved in public safety in Great Britain.
Airwave Solutions	Airwave Solutions Limited.
Blue light customers	British emergency services that are identified as users of the Airwave network under Airwave Solutions' licence.
BT	British Telecommunications plc.
CMA	Competition and Markets Authority.
DoR	Deed of Recovery. The February 2016 agreement between the Home Office and Motorola, the aim of which is to reduce the extent to which Motorola could benefit from delays in delivering ESN.
Economic profit	The difference between the revenue received by the business and the costs of all inputs used to provide the good or service, including the opportunity costs.
EE	EE Limited.
ESN	Emergency Services Network, a secure communications solution that is expected to replace the Airwave network in due course.
IRR	Internal rate of return.
KBR	Kellogg Brown & Root Limited.
LMR	Land Mobile Radio.
LTE	Long Term Evolution.
MCPTT	Mission Critical Push To Talk.
MIR	A Market Investigation Reference provides for a detailed examination of whether there is an **AEC** in the market(s) for the goods or services being referred. Following a

	market investigation, a wide range of legally enforceable remedies are available to make the market(s) more competitive in the future.
Motorola	Motorola Solutions, Inc. and all relevant subsidiaries.
NAO	National Audit Office.
NBV	Net Book Value.
NPV	Net Present Value.
OFCOM	Office of Communications.
OFT	Office of Fair Trading – one of the predecessor bodies to the CMA.
PFI	Private Finance Initiative.
PFI Agreement	**PFI** arrangement entered into by the Home Office and BT in 2000 for the design, build, finance and operation of the Airwave network.
PITO	Police Information Technology Organisation. It was responsible for identifying and developing the use of information and communication technology among police forces. It was abolished in 2007 with responsibilities passing to the National Policing Improvement Agency.
ROCE	Return on capital employed, being operating profits divided by net operating capital employed.
Sharer customers	Organisations that are not **blue light customers**, but are involved in public safety related activities and have a need to communicate with the blue light customers in emergency situations.
TETRA	Digital terrestrial trunked radio, a set of standards developed by the European Telecommunications Standardisation Institute that describes a common mobile radio communications infrastructure throughout Europe.
WACC	Weighted average cost of capital, being the the return on investment that providers of capital – both debt and equity

	– expect, given the risks associated with the relevant activity.