National Audit Office

Identity and Passport Service: Introduction of ePassports

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 152 Session 2006-2007 | 7 February 2007

The National Audit Office scrutinises public spending on behalf of Parliament. The Comptroller and Auditor General, Sir John Bourn, is an Officer of the House of Commons. He is the head of the National Audit Office, which employs some 850 staff. He, and the National Audit Office, are totally independent of Government. He certifies the accounts of all Government departments and a wide range of other public sector bodies; and he has statutory authority to report to Parliament on the economy, efficiency and effectiveness with which departments and other bodies have used their resources. Our work saves the taxpayer millions of pounds every year. At least £8 for every £1 spent running the Office.

National Audit Office

Identity and Passport Service: Introduction of ePassports

LONDON: The Stationery Office
£13.50

Ordered by the
House of Commons
to be printed on 5 February 2007

CONTENTS

SUMMARY 4

PART ONE

ePassports have been introduced to meet international requirements and improve security 6

The Identity and Passport Service, the Foreign & Commonwealth Office and the Immigration and Nationality Directorate are all implementing projects to aid the introduction of ePassports 6

The US Visa Waiver Program dictated the timescale for the project 7

International requirements dictated chip design and the type of identifier on the chip 8

Implementing ePassports has increased the cost of passports 8

PART TWO

The Identity and Passport Service produces ePassports which meet international standards and US Visa Waiver Program requirements 11

The UK ePassport meets international requirements and is harder to forge 11

There were a number of risks to value for money in delivering the project 13

This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act.

John Bourn
Comptroller and Auditor General
National Audit Office

5 February 2007

The National Audit Office study team consisted of:

Geraldine Barker, Vikki Jones and Stuart Kinross assisted by Ruth Hopkinson, Momodu Kawa and Carly Rose under the direction of Aileen Murphie.

This report can be found on the National Audit Office web site at www.nao.org.uk

For further information about the National Audit Office please contact:

National Audit Office
Press Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

Tel: 020 7798 7400

Email: enquiries@nao.gsi.gov.uk

© National Audit Office 2007

Key parts of the implementation were purchased without competition 14

The Identity and Passport Service did not consider fully the impact of this project on other parts of government 15

Customer service targets were maintained during project implementation 16

PART THREE

Risks exist to the delivery of value for money in the long term 17

There are a number of risks and uncertainties which remain to be resolved in the longer term 17

It is not yet clear whether increased security benefits will be delivered at border control 17

Facial recognition software is not reliable enough to use with large databases 18

Durability of the ePassport chip unit remains unknown 18

Critical staff and institutional memory are at risk of being lost 18

The Identity and Passport Service intends to compete the next contract for ePassport production 19

The ePassport fee could rise in the future 19

APPENDICES

1 Identity and Passport Service 21

2 Methodology 27

3 The Identity and Passport Service's amended agreement with Security Printing and Systems Limited 29

4 International comparisons 31

5 International requirements 34

6 Calculation of the benefit to the UK economy 36

7 Follow-up on previous Public Accounts Committee recommendations 38

8 Glossary of acronyms and terms 40

Photographs courtesy of the Identity and Passport Service.

SUMMARY

This report examines the Identity and Passport Service's project to introduce ePassports. An ePassport contains an electronic chip and antenna, to store and transmit to an electronic reader the passport holder's digital photograph and biographical information. The chip also contains an electronic signature confirming the issuing country and the integrity of the data to provide extra checks at border control. The budgeted set-up costs for the project were £63 million, and marginal production costs from 2005-06 to 2010-11 are estimated to be £195 million.[1]

Rather than put a new contract for ePassport production out to competition, the Agency invoked an exemption from procurement regulations on security grounds which offered it the option of amending its existing supplier contract for digital passports to incorporate ePassport production. The Agency chose this route because of delays in evolving international standards on ePassport design and substantial compensation costs would have been payable if the existing contract were to be ended early. The Identity and Passport Service took steps to secure value for money in the amended contract terms. However, longer term risks to value for money remain due to the technical novelty of ePassports, the risk of organisational knowledge loss and potential problems using electronic readers at border control.

1 In this report the marginal cost of ePassport production refers to the additional cost of producing ePassports over and above the costs of those elements which would have been contained in digital passports.

Main findings

- The Identity and Passport Service managed the implementation project successfully, delivering it within budget and to a timescale that ensured the UK's continued participation in the United States' Visa Waiver Program. The Identity and Passport Service undertook a gradual switch from digital to ePassports and met the majority of its customer service targets during the transition.
- British ePassports meet international standards on ePassport design and have demonstrated their interoperability in international tests.
- Although it has been tested in laboratory conditions, the ability of the chip unit[2] to withstand real-life passport usage is unknown. The chip units have a two year warranty but British ePassports are intended to last ten years. The Identity and Passport Service is keeping this issue under review.
- With the right equipment, technical experts have shown that it is possible to read and clone ePassport chips. To access the data on a chip, prior knowledge of the information contained on the passport data page is required. But if the information on the data page can already be seen (or is known from another source) then there is no need to read the electronic chip since it contains no more biographical information other than that visible on the data page with the naked eye. New security features in the ePassport design are intended to render impractical the creation of a faked ePassport in which a cloned chip could be inserted. The Identity and Passport Service told us that any alteration of the data on cloned chips would be detected when the ePassport is read by an electronic reader at border control.
- Future liabilities may arise from intellectual property rights relating to the design of electronic components which are held by contractors.
- The Identity and Passport Service spent £4.9 million on consultants during the project. The Identity and Passport Service recognises the need to reduce its reliance on consultants and interim staff and to devote greater attention to knowledge transfer. Using civil servants in non-technical roles within the future passport development project could save £3.5 million over the next five years and help retain organisational memory.
- There was insufficient liaison between the Identity and Passport Service and the Immigration and Nationality Directorate about how ePassports would be read at border control.
- The Immigration and Nationality Directorate began testing the ability of electronic readers to cope with high volumes of ePassport checks in late November 2006. If readers cannot cope, the full benefits of ePassports may not be realised.

Recommendations

1 To manage the risks to value for money, the Identity and Passport Service should:

- analyse the costs and benefits of a negotiated increase in the chip unit warranty and revisit this issue, and the question of passport validity, as more evidence of durability emerges;
- test the market as soon as possible for potential suppliers to compete for the new contract for ePassport production which will begin in October 2010;
- clearly document the basis for claiming any future exclusion from procurement regulations;
- reduce expenditure on technical consultants by using alternative methods of remuneration such as fixed-price contracts and bonuses for work delivered, rather than paying daily rates; and
- reduce expenditure on non-technical consultants in project teams by: developing a sustainable core of in-house project management skills to be supplemented with external specialists when required; and employing permanent staff rather than consultants to perform business analysis and administrative functions.

2 To increase effective working between government departments, the Home Office should:

- oversee the sharing of technical expertise between the Identity and Passport Service and the Immigration and Nationality Directorate to ensure the forthcoming upgrade of readers at UK Immigration is timely and enables prompt reading of ePassports;
- aggregate the purchase of biometric consultancy, readers and other equipment across the Home Office, appointing a lead purchaser who could also act on behalf of the Foreign & Commonwealth Office to secure better prices; and
- manage any future upgrades to ePassports as a cross-agency project encompassing the Identity and Passport Service, the Foreign & Commonwealth Office and the Immigration and Nationality Directorate with a Senior Responsible Owner, a single project plan and project board.

2 Throughout the rest of this report the term 'chip unit' will be used to denote the chip, its operating system, the antenna and the plastic covering in which they are all housed.

PART ONE

ePassports have been introduced to meet international requirements and improve security

The Identity and Passport Service, the Foreign & Commonwealth Office and the Immigration and Nationality Directorate are all implementing projects to aid the introduction of ePassports

1.1 About 48 million UK nationals, more than 80 per cent of the eligible population, hold a UK passport. Changing international requirements and increasing concerns about fraud and forgery have led 50 countries, including the United Kingdom, to develop plans for electronic passports (ePassports).[3] The UK's project to implement ePassports is being managed by the Identity and Passport Service.

1.2 An ePassport contains an electronic chip storing biographical information and a digital facial image of the passport holder[4] **(Figure 1)**. In order to read the chip contents, the passport needs to be opened at the data page and placed on an appropriate electronic reader (see Appendix 1).[5] ePassports are intended to be harder to forge than the current digital passports[6] and, where appropriate readers are in place at border posts, Immigration Officers will be able to compare the photograph on the chip with that in the passport and the person in front of them, thereby building on existing skills to confirm the bearer's claim to the identity associated with the passport.[7] Applicants' digitised photographs and biographical data[8] are also stored on a database managed by the Identity and Passport Service.

1.3 The Identity and Passport Service issues over six million passports each year. Security Printing and Systems Limited is contracted to produce and personalise the passport book and Siemens Business Services processes applications and manages the Passport Applications Support System database. The budgeted set-up costs of £63 million are being recouped via the fee paid by passport applicants.[9] The Foreign & Commonwealth Office issues around 450,000 passports a year to UK residents living abroad. The Foreign & Commonwealth Office's project to manage the transition to ePassports has cost £3.7 million which is being recouped via an increase in the fee paid by overseas passport applicants.[10]
The Immigration and Nationality Directorate is responsible for the deployment and upgrade of passport readers at UK ports of entry to enable immigration officials to read ePassports. For practical reasons and to ensure the effective use of resources, the Immigration and Nationality Directorate ePassport reader project was combined with its project to upgrade border control technology.
The element of the project which relates to reading ePassports is budgeted at £1.4 million, which will be met from the Immigration and Nationality Directorate's budget.[11] This figure excludes costs associated with in-house business change, fraud and training since they are absorbed within normal running costs. Roll-out costs are also excluded because they are absorbed within the main technical upgrade project, and support and maintenance costs are accounted for elsewhere under a wider maintenance agreement.

3 Source: eStrategies roundtable discussion, *Working together on ePassports and National ID*, Prague, 21 April 2006.
4 The facial images in UK ePassports are digitised at a resolution of 300 dots per inch.
5 As a security feature, an electronic key is obtained from the data page during this process which is required to 'unlock' the chip and access its contents.
6 Digital passports contain a printed photo of the holder rather than one that is pasted in. They do not contain an electronic chip.
7 The comparison of the chip photo with the printed photo and the passport holder is performed by an Immigration Officer rather than by computer. Automated comparison was not an explicit aim of this project although such a development is a long term international goal.
8 This is the same biographical data as is printed on the data page of the passport.
9 The £63 million budget comprises £60 million capital costs and £2.8 million revenue costs. Source: Identity and Passport Service.
10 The Foreign & Commonwealth Office's project is known as the Biometric Recognition Information Technology project or 'BRIT'.
11 Source: Home Office Border Control Strategy Implementation Unit, unaudited by National Audit Office.

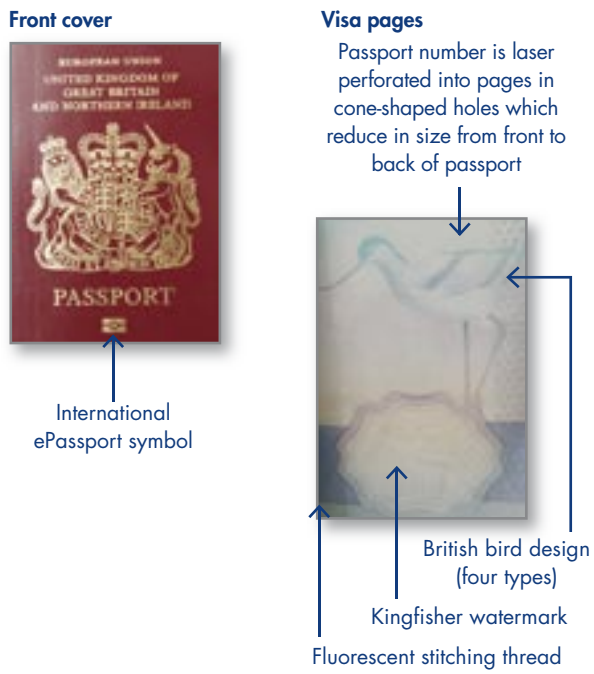
1.4 This report examines whether the Identity and Passport Service's project to introduce ePassports has been well-managed, in terms of minimising costs and maximising benefits and meeting international requirements; and the extent to which it liaised with the Foreign & Commonwealth Office and the Immigration and Nationality Directorate to ensure successful implementation of their related projects (see Appendix 2 for further details).

The US Visa Waiver Program dictated the timescale for the project

1.5 Under the US Visa Waiver Program, holders of UK passports can travel to the United States for periods of up to 90 days without obtaining a visa costing $100 (or £63[12]). Six per cent (4.2 million) of the 66.4 million overseas trips made by UK residents in 2005 were to the United States,[13] accounting for about 30 per cent of all visitors to the United States under the Program.[14] The US Enhanced Border Security and Visa Entry Reform Act (May 2002), required that nations wishing to remain in the Program had to issue ePassports by 26 October 2004. Following joint lobbying from the Foreign & Commonwealth Office and the Identity and Passport Service and representatives of other countries, the United States has twice extended its deadline for ePassports, moving the deadline in July 2004 to 26 October 2005 and in June 2005 to 26 October 2006. Valid passports issued prior to 26 October 2005 can still be used for travel to the United States provided they contain a machine readable zone. Passports issued between 26 October 2005 and 25 October 2006 require a machine readable zone and digital photograph printed on the biodata page for travel to the United States.

1.6 The Identity and Passport Service aims to ensure that UK citizens are 'able to travel freely through the continuous development of the UK passport to meet international requirements'.[15] The decision to implement ePassports that meet US Visa Waiver Program requirements was in line with this aim. The Identity and Passport Service also examined the economic case for meeting the deadline. During the project life, a number of cost-benefit analyses were performed (see Appendix 6). The final cost-benefit analysis claimed the introduction of ePassports would generate £89 million worth of savings for the UK economy between 2003-04 and 2010-11.

1 The ePassport is designed to be more difficult to forge



Source: National Audit Office based on Identity and Passport Service literature and staff interviews

12 £63 is the current fee charged by the US Embassy in London as an approximate equivalent of $100.
13 Office for National Statistics, *Transport, Travel and Tourism*, Quarter 1, 2006.
14 National Audit Office analysis of data from US Office of Travel and Tourism Industries, http://www.tinet.ita.doc.gov/cat/f-2005-203-001.html.
15 Identity and Passport Service, *Business and Corporate Plans, 2006-2016*, page 10.

The estimated benefits were based on cash and time saved by avoiding the need for UK passport holders to obtain a visa for travel to the US. The analysis was based on a number of estimates, most of which were prudent. For instance, 24 per cent of UK residents' trips to the US were assumed to require a visa, but the real figure is likely to be higher. Other assumptions were less cautious: each visa was assumed to last a year although they can last up to ten years, and the analysis did not take into account the related costs incurred by the Foreign & Commonwealth Office and the Immigration and Nationality Directorate.

International requirements dictated chip design and the type of identifier on the chip

1.7 To ensure that UK citizens can travel freely, ePassports must conform to standards set by the International Organization for Standardization on the design of the chip and data formats, and by the International Civil Aviation Organization on the overall design and features of the ePassport, including the data and the security features protecting it (see Appendix 5). The latter organisation requires that the chip contains an image of the passport holder's face.[16] It also requires all countries issuing ePassports to provide readers at public locations so passport holders can check the contents of the chip for themselves. There are additional EU requirements specifying that by 2009 ePassports should include fingerprint data which will require personal attendance for fingerprint enrolment. The UK is not obliged to comply with the EU regulations as it is not a signatory of the Schengen Agreement[17] but has decided to do so voluntarily so that it can participate in the development of the EU regulations and maintain the security of the British passport on a par with other major EU nations.

1.8 As the UK's representative, the Identity and Passport Service plays an active role in the development of the International Civil Aviation Organization standards. It also worked closely with the Dutch and German governments to develop technical guidelines for ePassport readers.

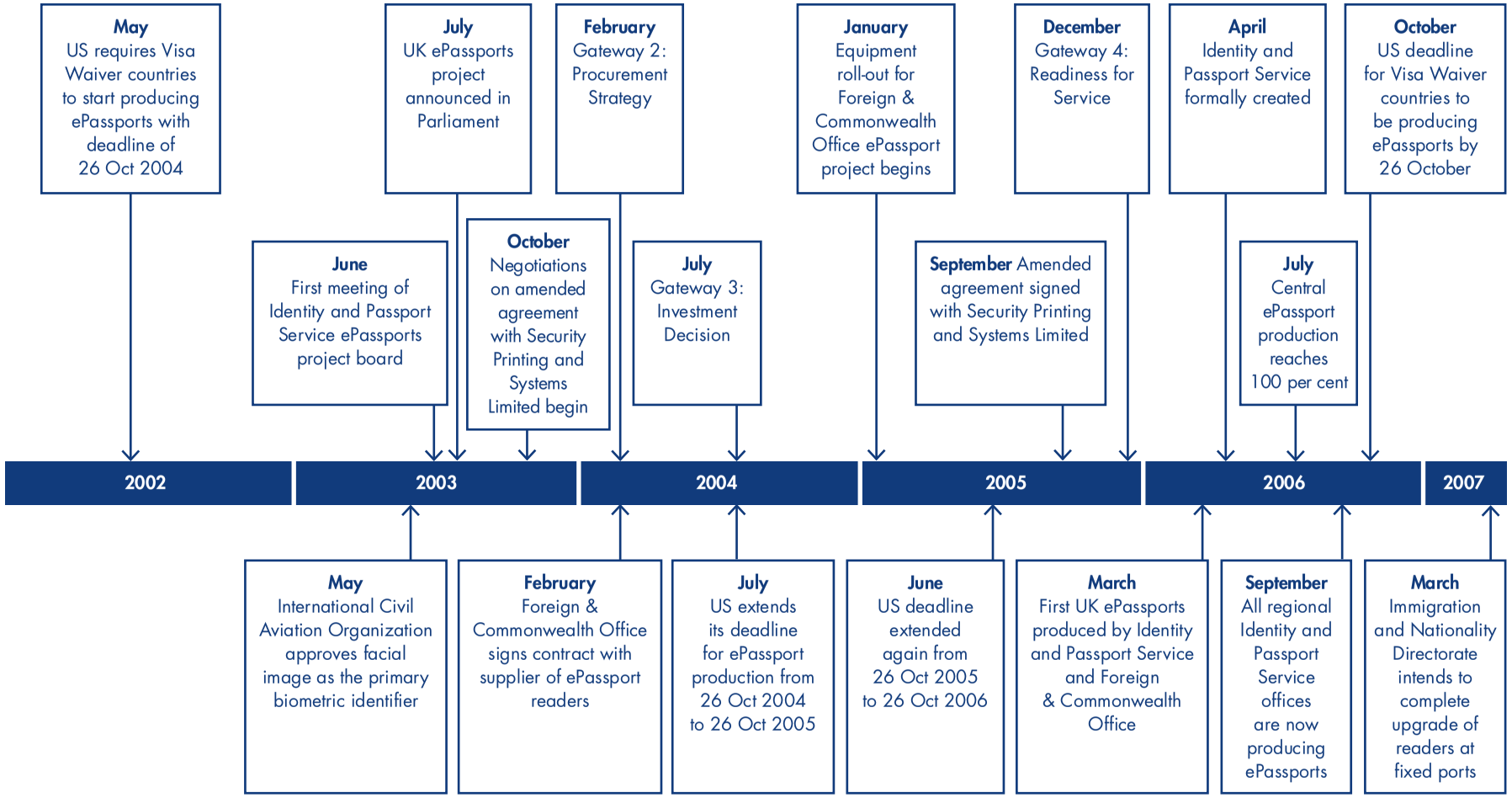
1.9 The decision to proceed with the ePassports project was taken by the Identity and Passport Service in May 2003 after the International Civil Aviation Organization had approved facial recognition as the primary means of biometric identification for travel documents. **Figure 2** shows the chronology of key events in the ePassports project. The Home Office Group Investment Board reviewed the ePassports business case in December 2004 and approved set-up costs of up to £70 million over 2004-2007 and a marginal ePassport unit cost of up to £11.50.[18] The project was managed in accordance with Office for Government Commerce (OGC), HM Treasury and Group Investment Board principles, and was subject to the OGC Gateway Review process.[19] It was overseen by a project board headed by a Director, which reported to a wider Programme Board headed by the Identity and Passport Service's Executive Director of Service Delivery. The Foreign & Commonwealth Office and the Immigration and Nationality Directorate managed their own implementation projects. The Foreign & Commonwealth Office was represented on the ePassports project board from June 2003. The Immigration and Nationality Directorate only began attending project board meetings in December 2005.

Implementing ePassports has increased the cost of passports

1.10 As was the case with digital passports, ePassports are intended to be self-financing with all costs covered by increases in the passport fee. On 5 October 2006, the fee for a standard adult passport increased from £51 to £66 and the standard child fee increased from £34 to £45. **Figure 3 on page 10** shows passport fee increases since 1998. The key driver of the latest fee increase is the cost of the production of the passport book which has increased by £7.25 to £12.25, **see Figure 4 on page 10**. The UK ePassport is mid-priced compared with the cost of ten-year ePassports produced by those other countries where, like the UK, there is no state subsidy (see Appendix 4).

16 http://www.icao.int/mrtd/biometrics/recommendation.cfm.
17 The Schengen Agreement (1985) requires its signatories to commit to the eventual removal of controls at common borders and freedom of movement for all their nationals. Of the EU member states, Ireland and the UK are only partial participants in the agreement and have maintained their border controls.
18 The Home Office Group Investment Board approved the inclusion of contingency costs relating to disaster recovery within set-up costs, rather than within the ePassport marginal unit cost.
19 Gateway Reviews are carried out on major IT-enabled construction and procurement programmes and projects. These can be reviewed at six stages of the procurement lifecycle. In the case of ePassports, Gateway Reviews have so far taken place at Gateways 2, 3, and 4 (see Figure 2).

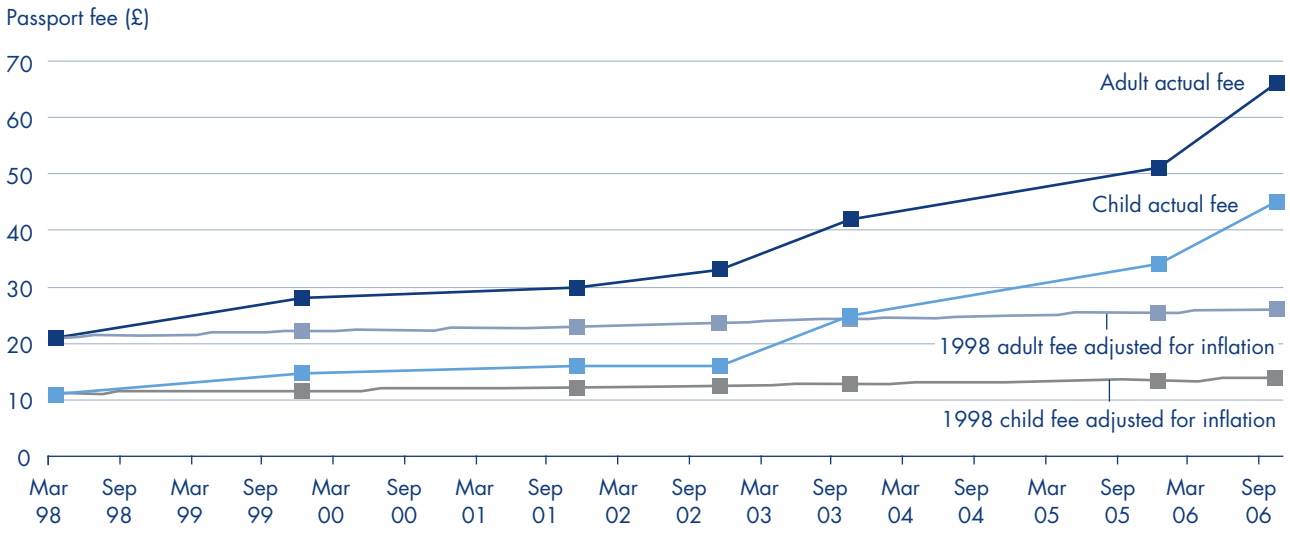
2 The Identity and Passport Service produced its first ePassports in March 2006



Source: National Audit Office

1.11 The new fee also includes £5.88 to cover the cost of the new Authentication by Interview project. Authentication by Interview requires all first-time passport applicants to attend an identity authentication interview with a specially trained interviewer. The programme involves the establishment of 69 offices across the UK, located according to population density.[20] Changes to IT systems and the time taken to acquire new premises mean that the project will not go live at the end of 2006 as originally intended. The testing and piloting of the project will now take place in the last quarter of 2006 and the first quarter of 2007. The revised start date of the project will depend on the outcome of this work.

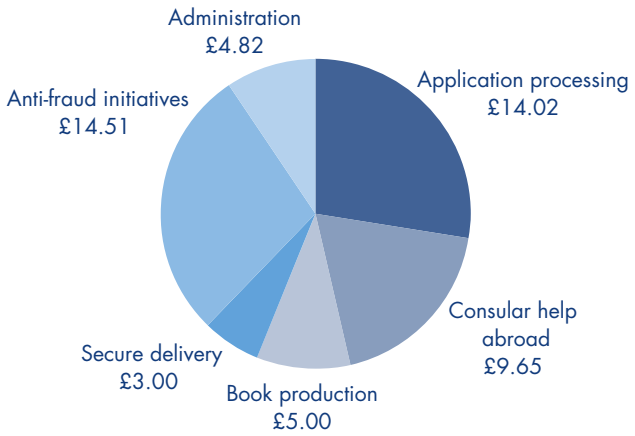
3 Fees for adult and child UK passports have risen ahead of inflation between 1998 and 2006



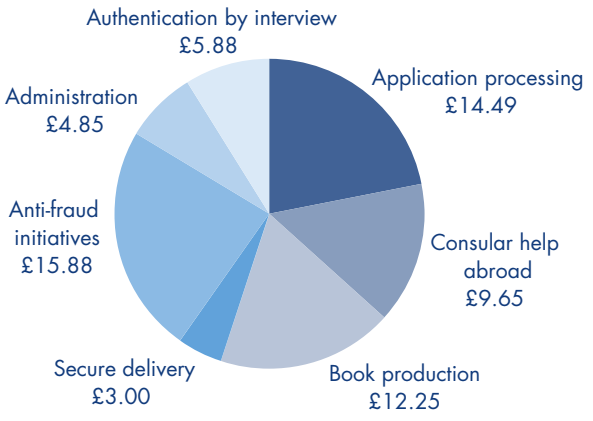
Source: National Audit Office analysis of Identity and Passport Service data

4 Increased cost of book production and the introduction of Authentication by Interview have been the main drivers of the latest price increase

£51 UK passport fee (before October 2006 increase)



£66 UK passport fee (after October 2006 increase)



Source: Identity and Passport Service public literature and management information

20 Details of the 69 offices can be found online: http://www.passport.gov.uk/downloads/Passport-Interview-Network-May2006_new.pdf.

PART TWO

The Identity and Passport Service produces ePassports which meet international standards and US Visa Waiver Program requirements

2.1 The Identity and Passport Service produced its first UK ePassport on 6 March 2006 and achieved 100 per cent production of ePassports in September 2006. By that time, 2.2 million ePassports had been issued to UK passport holders. Between March and September 2006 ongoing demand for passports was met by producing a mix of ePassports and digital passports. **Figure 5 overleaf** shows the gradual transition at the central production line from digital passport production to ePassport production in the period March to July 2006. As the second largest passport issuer in the world[21] and acknowledging previous Public Accounts Committee recommendations (see Appendix 7), the Identity and Passport Service decided on a progressive roll-out rather than switching to 100 per cent ePassports on a fixed date. This proved to be a sound approach.

The UK ePassport meets international requirements and is harder to forge

2.2 An independent report commissioned by the Identity and Passport Service[22] confirmed that the ePassports issued by the Identity and Passport Service comply with the regulations of the International Civil Aviation Organization and the International Standards Organization (see Appendix 5). The US Department of Homeland Security has confirmed that sample UK ePassports have been successfully read by US ePassport readers at its test facility and has granted the UK continued US Visa Waiver status.

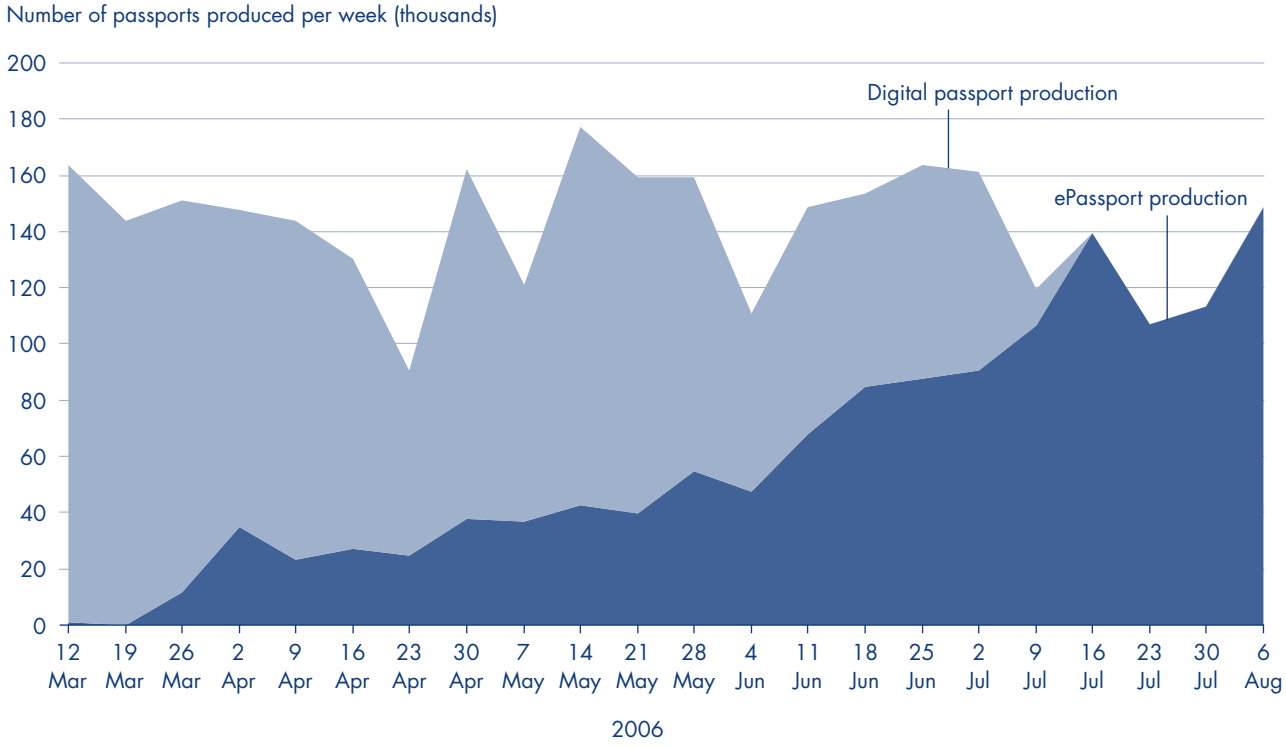
2.3 As required by the International Civil Aviation Organization,[23] the Identity and Passport Service has set up an ePassport reader at each of its seven regional offices to enable ePassport holders to check their ePassport chip functions and that the contents are accurate. Each of these readers cost £3,000. Initially, the Identity and Passport Service did not publicise the service in order to minimise pressure on their counter staff during the transition to ePassports. Between April and July 2006 eleven people used this service, although an average of more than 13,500 people a week attended an Identity and Passport Service office in person during that period.[24] The publicity for the service began in September 2006. The Identity and Passport Service intends to deploy self-service ePassport reader kiosks during 2007.

2.4 The incorporation of the chip unit alongside other new security features such as watermarks and specialist thread, (see Figure 1), make ePassports harder to forge than digital passports. In accordance with international standards, there are other features to safeguard the information held on the chip:

- To ensure the chip cannot be read covertly (known as 'skimming'), an ePassport must be opened and placed flat on the reader plate before communication can begin. The reader must generate digital encryption keys from information on the biodata page before the chip's contents can be read.
- The communication between the chip and the reader is encrypted so that even if it is electronically eavesdropped it is harder to decipher.
- During manufacture, passport authorities use secret country-specific digital keys to add a digital signature to the chip. This enables border control officials to check whether an ePassport has been issued by an authorised entity.
- Using the digital signature, the electronic reader is also able to detect whether the contents of the chip have been altered since the ePassport was manufactured.

21 According to Identity and Passport Service-collated data. The United States is the largest passport issuer in the world and began issuing ePassports on 14 August 2006.
22 *ePassport Standards Compliance Report for UK Passport Service*, March 2006, Temporal S Limited.
23 See Appendix 5.
24 Identity and Passport Service management information.

5 There has been a gradual transition to full central ePassport production



Source: National Audit Office analysis of Identity and Passport Service management information (unvalidated)

NOTE

The peaks and troughs in production reflect changes in demand for passports some of which are linked to the timing of public and school holidays.

2.5 Recent media reports[25] have described instances where technical experts with the right equipment have succeeded in reading and cloning ePassport chips. In order to read an ePassport chip, the digital encryption key needs to be derived from information contained on the ePassport data page. If the information on the data page is already visible however, there is no need to read the chip to gather the same information. To access the data on a chip when the ePassport is closed, knowledge of the passport number, expiry date and the holder's date of birth would be required to generate the digital encryption key. The International Civil Aviation Organization has made public the method of deriving the digital encryption key in order to ensure interoperability between readers and ePassports and to allow ePassports to be easily read by border control authorities worldwide. When fingerprints are introduced into ePassports from 2009, the chip will be protected by a higher level of security that will require an electronic reader to identify itself to the chip and demonstrate its authenticity before the data can be read.

2.6 Although it is possible to clone the details of one chip onto another, any alteration of those details would be detected when the digital signature on the chip is read at border control. If a forger were to succeed in cloning a chip they would also need to create a forged ePassport in which to insert that chip, since new security features are intended to make the substitution of a chip into an existing ePassport virtually impossible. If such a fake passport could be made, it could only potentially be used by someone who strongly resembles the genuine holder of the passport from which the chip data was taken. However, as well as comparing the photograph on the chip and the person in front of them, immigration officials will continue to use existing skills to assess the bearer's claim to the identity associated with the passport. One of the goals of automated border control – where real life facial biometrics will be matched against the biometrics in the ePassport – is to enhance controls preventing the fraudulent use of someone else's passport for travel.

25 *'Cracked it!'* The Guardian, 17 November 2006; *'Hackers clone ePassports'*, http://www.wired.com/news/technology/0,71521-0.html?tw=wn_tophead_19, 3 August 2006.

2.7 To make the manufacturing process of the passport secure, all staff from the Identity and Passport Service and its contractors are security cleared. There are also a number of physical security measures at the main production facility and regional offices to prevent unauthorised access to production equipment. As of 18 December 2006, the National Document Fraud Unit had not been notified of the discovery of any forged UK ePassports.

2.8 The ePassport chip unit has been tested for its ability to withstand reasonable exposure to extremes of temperature, humidity, x-rays, electric and magnetic fields and other environmental factors. Tests to simulate the effect of immigration hand stamps and the writing pressure of a ballpoint pen have also been conducted. The scanners used to digitise applicants' photos have been independently evaluated[26] and shown to comply with the international standard on facial image format.[27] The UK ePassport has also performed well in trials to test whether it can be read by different types of ePassport reader. These tests included 16 bilateral tests where the Identity and Passport Service swapped sample ePassports with other nations and shared the results of attempts to read those passports, as well as five international 'interoperability' events where the interaction between a large number of countries' sample ePassports and readers from a range of manufacturers were tested.

There were a number of risks to value for money in delivering the project

2.9 Implementing ePassports required the Identity and Passport Service to:

- Negotiate an amended and restated agreement[28] with its main supplier Security Printing and Systems Limited to:
  - source and procure the chip units at an estimated cost of £92 million;[29]
  - source and procure new production machinery at a cost of £18.5 million[30]; and
  - change the production processes at the main production facility.
- Install new machinery to produce ePassports at the Identity and Passport Service's seven regional offices and train staff to use it.

In addition, the Identity and Passport Service has a separate project to create a reserve facility at a cost of £48 million over 16 years[31] which will produce passports in the event of a disaster at the main production facility. The reserve facility is intended to come into operation in March 2007. As a result of the increase in the cost of passport books, this is now a more cost-effective alternative to previous contingency planning which involved storing a year's stock of unpersonalised books at the Bank of England. The increased value of ePassport blank books means continuing to store books would have cost up to £60 million over five years.[32]

2.10 By the end of November 2006, the Identity and Passport Service had spent £54.2 million to set up the ePassports project which included ePassport development costs, machinery purchase, set-up and testing. The outturn for set-up costs is expected to be £61 million. This is compared with a budget of just under £63 million **(see Figure 6 overleaf)**. The capital investment is initially funded by the Home Office and then recovered from the passport fee.

2.11 The Identity and Passport Service pays Security Printing and Systems Limited a fixed price for each passport book produced. The fixed price varies depending on the volume of ePassports produced during each 12 month period from October to September for the duration of the amended agreement. To avoid frequent changes to the fee charged to passport applicants, the actual costs are smoothed over time (see Appendix 1, Paragraph 5). In the contract year to October 2006, the additional fixed price paid for the electronic element was higher because the first ePassports were produced in March 2006 and so volumes were low for the first year of the project. The average price for the electronic element of the ePassport is expected to fall as a result of increased volumes in subsequent years. The cost of production is being met from the main Identity and Passport Service budget, rather than the project budget.

26 *Addendum to Kodak i620 Scanner Evaluation*, June 2005, Roke Manor Research Centre.
27 International Organization for Standardization standard number ISO/IEC 19794-5 Face Image data.
28 Throughout the rest of the report the amended and restated agreement will be referred to as the amended agreement.
29 This figure is calculated using the actual number of ePassports produced between March 2006 and September 2006, and Identity and Passport Service's prediction of the number of ePassports to be produced between October 2006 and September 2010.
30 £18.5 million was spent on ePassport production machinery of a total £45 million of contracted set-up costs.
31 Costs are estimated for the 16 years 2005-06 to 2020-21. The project includes the cost of land and buildings, set-up costs, security and running costs, but does not include ePassport production machinery which was budgeted for in the main ePassports project.
32 Source: Reserve Facility business case, which assumed an approximate unit cost of £10 per passport and a year's supply of six million passports. Since the UK passport design is updated typically every five years, the year's supply, valued at £60 million, would become obsolete if not used before the next design update.

6 Total costs are expected to be lower than budget

	Budgeted cost March 2003 to March 2007 £000s	Actual cost May 2003 to November 2006 £000s	Predicted outturn[1]
Set-up costs	**62,832**	**54,215**	60,732
Capital costs	60,045	51,191	57,708
Revenue costs	2,787	3,024	3,024

	Budgeted cost October 2005 to September 2010 £000s	Actual cost April 2006 to November 2006 £000s
Ongoing costs (marginal cost of ePassport production over and above digital element of passport)	195,200	23,770

	Budgeted cost 2004-05 to 2020-21 £000s	Actual cost December 2004 to November 2006 £000s
Reserve facility	48,048	3,804

Source: National Audit Office analysis of Identity and Passport Service management information

NOTE

1 The predicted outturn is a best estimate as at December 2006 of full lifetime ePassport project costs. Although the main project is now complete, some further expenditure relating to the reserve facility production line machinery is expected in the next few months.

Key parts of the implementation were purchased without competition

The contract to purchase the ePassport book was not put out to competitive tender

2.12 In October 2003, the Identity and Passport Service invoked a 'security exemption' from normal procurement practice, which allowed it to proceed without advertising the contract for the production of ePassports in the Official Journal of the European Union. The security exemption also meant the Identity and Passport Service could choose whether or not to hold a competition for the contract. In accordance with procurement regulations[33], the Agency justified the use of the security exemption on the basis that the production of ePassports required 'special security measures' to be in place. Blank ePassports contain printed and electronic features which mean they are classified as confidential material and Cabinet Office guidance[34] sets down detailed requirements for the secure protection of such assets. Although the Identity and Passport Service's amended agreement with Security Printing and Systems Limited specifies a number of special security measures relating to the production of ePassports, we have not seen evidence that the Identity and Passport Service documented the specific security measures that it used to justify the security exemption. The Identity and Passport Service's legal advisers told us that, as a general principle, public authorities should document the basis for claiming such exclusions from procurement regulations.

2.13 Rather than hold a competition, the Identity and Passport Service chose to negotiate with Security Printing and Systems Limited an amended agreement to its existing contract for the production of digital passports. The decision to negotiate an amended agreement, which covered the production of ePassports, was chosen for the following reasons:

- sufficiently detailed international technical standards were not formulated until 2005 which meant an invitation to tender document could not be prepared in time to meet the necessary timescale;
- even if a tender document could have been prepared, the time taken to procure a new contractor would have meant the US Visa Waiver deadline could still not be met; and
- a clause in the existing production contract would have triggered the payment of substantial compensation costs were that contract to be terminated.

2.14 The original contract with Security Printing and Systems Limited was let as a Private Finance Initiative contract in 1998 following a competition, although the contract was exempt from EU advertisement on the grounds of national security. In October 2003, the Identity and Passport Service began negotiating with Security Printing and Systems Limited an amended agreement to the existing contract for the implementation of ePassports (see Appendix 3) and asked the company to continue the research and development work it had already begun on defining a technical solution for production of ePassports.

2.15 The total cost of the contract with Security Printing and Systems Limited is estimated at £448 million over the 12 years from 1998 to 2010.[35] This sum covers the

33 *Public Services Contracts Regulations 1993*, Statutory Instrument 3228, The Stationery Office.
34 *Manual of Protective Security*, Cabinet Office, September 2006.
35 There is a break clause in the contract should the Identity and Passport Service wish to withdraw from the agreement.

production of the digital element of passports between 1998 and 2010; the set-up costs of ePassport production; and the production of the electronic element of ePassports.[36]

2.16 The Identity and Passport Service sought to achieve value for money despite the lack of a competitive procurement in a number of ways. PricewaterhouseCoopers was employed to develop and agree a detailed analysis of the costs on which the amended agreement with Security Printing and Systems Limited would be based. The amended agreement established key performance milestones for the set-up phase, and payment was linked to their achievement. Service Level Agreements were agreed for the production of certain volumes of ePassports within specified timeframes. 'Lock-in' negotiations led to a reduction in the original quote for the total cost of the production contract, as well as improved agreement terms which included reductions in the proposed profit margin and wastage rates (see Appendix 3).

There was only one source of chip suitable for incorporation into the ePassport

2.17 At the time that the amended agreement with Security Printing and Systems Limited was negotiated, Philips Semiconductors was the only supplier expected to achieve security clearance that was able to provide the chips required for ePassports. Rather than contracting directly with Philips Semiconductors, the Identity and Passport Service decided that Security Printing and Systems Limited should contract with Philips Semiconductors provided that Security Printing and Systems Limited 'topped up' the liability rates available from Philips Semiconductors and assumed a greater risk in the event of a chip failure. The Identity and Passport Service was party to the negotiations between Security Printing and Systems Limited and Philips Semiconductors, and insisted that once another source of supply was found and certified, Security Printing and Systems Limited should also procure chips from that supplier. A second source is now ready to supply chips and Security Printing and Systems Limited intends to source a proportion of chips from them.

2.18 When the Identity and Passport Service negotiated its amended agreement with Security Printing and Systems Limited, it believed that chip prices would fall as more suppliers entered the market and production volumes increased. The amended agreement with Security Printing and Systems Limited assumed a fixed chip unit price of an agreed sum and held that for every penny variation during the life of the amended agreement[37], the price of each ePassport would adjust by an agreed sum in the same direction. In other words, if the cost of the chip unit were to fall, the overall cost of ePassport production would fall by a greater amount. The Identity and Passport Service was content to assume the risk of chip price fluctuation believing that prices were likely to fall during the term of the amended agreement.

The Identity and Passport Service made interim payments of £14 million to Security Printing and Systems Limited

2.19 Due to delays in evolving international standards, it was not until late 2005 that the Identity and Passport Service finally formalised a statement of requirements for the project. Security Printing and Systems Limited had to order production machinery in May 2004 in order to have time to install, test and bring it into operation prior to the then Visa Waiver deadline of 26 October 2005. An agreement to indemnify Security Printing and Systems Limited against its external costs had taken effect on 31 March 2004 (the date on which the amended agreement was originally due to be signed). At this stage, it was anticipated that the amended agreement would be signed at the end of January 2005, but in the event this did not happen until September 2005. By January 2005 however, Security Printing and Systems Limited needed a signed agreement to invest further funds and it asked the Identity and Passport Service to make monthly interim payments to cover costs. The Identity and Passport Service agreed to this request provided the expenditure was consistent with, and had been incurred solely for, the purposes set out in an agreed expenditure plan. Between February 2005 and signature of the amended agreement in September 2005 the Identity and Passport Service made interim payments of £14 million.

The Identity and Passport Service did not consider fully the impact of this project on other parts of government

There was no public sector Regulatory Impact Assessment

2.20 A public sector Regulatory Impact Assessment is a tool intended to help policy makers consider the wider impacts of a policy change, in particular possible effects on other government departments. The Identity and Passport Service said they did not perform a Regulatory Impact Assessment because international standards would have required the Foreign & Commonwealth Office and Immigration and Nationality Directorate to pursue their own projects regardless of the Identity and Passport Service

36 This figure is based on the actual cost of producing digital and ePassports between October 1998 and September 2006, and the estimated cost of producing the digital and electronic elements of ePassports between October 2006 and October 2010 based on predicted production volumes.
37 The amended agreement covers the period 14 September 2005 to 4 October 2010.

project. However, the Home Office Regulation Team told us the Identity and Passport Service should have performed at least an initial public sector Regulatory Impact Assessment to determine whether or not a full assessment was required. The ePassports project had financial and operational impacts on the Immigration and Nationality Directorate and the Foreign & Commonwealth Office but the lack of a Regulatory Impact Assessment or similar exercise meant these were not recognised in the Identity and Passport Service business case.

Greater collaboration with the Foreign & Commonwealth Office and the Immigration and Nationality Directorate may have yielded savings

2.21 Savings could have been achieved for the taxpayer if the Identity and Passport Service had collaborated with the Foreign & Commonwealth Office and the Immigration and Nationality Directorate to a greater extent at an early stage. The three organisations purchased electronic chip readers and encoders separately at varying prices. We estimate that if reader and encoder procurement had been managed under one contract, a 15 per cent reduction in total cost could have been achieved, equivalent to just under £116,000. The three organisations also recruited biometric expertise separately.

2.22 Although the Immigration and Nationality Directorate attended ePassports project board meetings from December 2005, the Identity and Passport Service told us the ePassport project team had not officially liaised with the Immigration and Nationality Directorate over its project to upgrade passport readers at UK ports. The Identity and Passport Service liaised more closely with the Foreign & Commonwealth Office and seconded some junior staff from the Identity and Passport Service to the Foreign & Commonwealth Office. The overall method of issuing ePassports by the Foreign & Commonwealth Office's overseas posts and the Identity and Passport Service regional offices is very similar, but during our visit to the Foreign & Commonwealth Office consulate in Madrid we observed differences in the processes and controls in operation compared with those at the Identity and Passport Service regional offices. For example, the Foreign & Commonwealth Office process did not include a check that the number of passports produced in any given batch was the same as the number initially approved, and the quality assurance function was carried out by the same person who had printed the ePassport. The Foreign & Commonwealth Office is looking to bring its processes in line with those operated by the Identity and Passport Service.

Customer service targets were maintained during project implementation

2.23 According to Identity and Passport Service management information, there was little disruption to the quality of service delivered to the public during the implementation of the ePassports project. Throughout the majority of the transition period the Identity and Passport Service met its targets to:[38]

- turn around 99.5 per cent of properly completed standard applications within ten working days;
- turn around 99.5 per cent of fast track applications within one week;
- offer 90 per cent of callers an appointment within three working days at one or more of its seven regional offices;
- see 92 per cent of callers within 20 minutes of their appointment time; and
- achieve a customer satisfaction rating of at least 95 per cent as measured through customer satisfaction surveys.

The four-hour turnaround time offered to applicants paying for the Premium service was met in all production sites with the exception of a two-day period at the London office during the first week of transition to ePassports.

2.24 The Identity and Passport Service did encounter some difficulties at the end of the roll-out when, during a period of peak demand, the central production line was briefly unable to produce enough blank ePassport books to meet its own needs as well as the demand from the Identity and Passport Service local offices and the Foreign & Commonwealth Office. The relevant contingency plan was implemented and for a six-week period in August and September some of the Identity and Passport Service local offices temporarily switched back to digital passport production. This issue was later resolved and complete conversion to ePassports was achieved at all sites by the end of September 2006.

38 Unaudited Identity and Passport Service management information.

PART THREE

Risks exist to the delivery of value for money in the long term

There are a number of risks and uncertainties which remain to be resolved in the longer term

3.1 Although the project to introduce ePassports within the US Visa Waiver Program deadline has been delivered, risks to value for money remain. Some elements of the project are not yet in place and in some respects the technology is unproven. These risks include:

- the project to upgrade passport readers at fixed UK ports to read ePassports will not be complete until spring 2007. The Immigration and Nationality Directorate told us this timescale was dictated by the need to test actual production quality ePassports against reading equipment and to take advantage of technical opportunities and cost reductions by combining it with the border control Technical Refresh Project. The impact of using readers to examine ePassports in high volume situations at UK immigration is unknown both in terms of the performance of the readers and potential delays to travellers;
- current facial recognition technology is not reliable enough to enable the automated checking of applications against the full database of existing passport holders although the Identity and Passport Service is piloting its use on a smaller scale;
- the durability of the ePassport chip unit for the full ten-year lifespan of the passport remains unproven;
- the loss of critical staff and institutional memory could threaten the cost-effective delivery of future projects; and
- the failure to engage with manufacturers on research and development for future changes to ePassports means those enhancements may not be delivered on time.

In addition, further passport fee rises may be required as a result of:

- patent costs to secure the use of certain intellectual property; and
- the costs of planned but as yet unbudgeted future developments including the introduction of second generation ePassports containing fingerprint data.

It is not yet clear whether increased security benefits will be delivered at border control

3.2 The increased security benefits of ePassports are intended to come from the extra checks which Immigration Officers will be able to perform by reading the chip: firstly a visual check that the photograph on the chip matches the printed passport photograph and the person in front of them; secondly confirmation that the passport has been issued by an authorised entity; and thirdly confirmation that the chip contents have remained unchanged since manufacture. The Immigration and Nationality Directorate is responsible for installing the readers to enable these checks. It has decided to:

- upgrade current readers at fixed ports[39] to access the biographical data held on the chip (the first check). This will cost an estimated £1.4 million as an element of an associated project and will be rolled out in spring 2007; and
- install a further 200 readers in back office locations which can read the digital signature (the second and third checks), at a cost of £1,300 each. The Immigration and Nationality Directorate has adopted this interim solution until the technical issue preventing full functionality at front desks is resolved.

39 A fixed port is an immigration post with either full time Immigration Officer presence or presence when scheduled services are due. There are about 50 fixed ports around the UK.

3.3 Front desk readers are estimated to take around 8 seconds to read chip data. Readers have not been tested in high volume situations and Immigration Officers will, until September 2007, have to leave the front desk to undertake additional checks of the digital signature using the readers located in back offices. This creates the risk that ePassport chips may not be read frequently enough to deliver the full security benefits. While there have been a number of international drivers to reaching agreement on the design and issuance of ePassports, there has been less pressure for agreement on how ePassports should be processed at border control. Nonetheless, the International Civil Aviation Organization recently noted that if inspecting entities do not check the electronic country certificate then 'the electronic data in an ePassport cannot be relied upon'.[40]

Facial recognition software is not reliable enough to use with large databases

3.4 The ePassports business case notes that the storage of biometric information should help reduce the risk of duplicate passports being issued. We were told by our consultants that the use of current facial recognition technology with two dimensional images of limited resolution (as is the case for ePassports) is not sufficiently reliable to enable fully automated searches even in relatively small databases[41], and performance is known to decline as database size increases. The Identity and Passport Service database of passport holders is large and still growing, so current facial recognition software cannot be used to check new applications against the entire database of existing ePassport holders. However, the Identity and Passport Service's piloting of facial recognition software to perform additional checks on suspect applications has identified over 400 confirmed facial matches, some of which relate to new passport applications. The Agency also believes there is good potential in the future for one-to-one comparison of the image held on the passport chip with the passport holder standing at border control, which could eventually enable automated border control of the sort currently being trialled in Australia.[42]

Durability of the ePassport chip unit remains unknown

3.5 The Identity and Passport Service has conducted substantial testing to gain comfort over the durability of the ePassport. However, the ability of chip units to withstand ten years of normal ePassport use remains unproven because the product is still so new. There are also technical concerns that facial features can change a great deal over a decade meaning that when the Identity and Passport Service brings facial recognition software into use, the software may fail to find matches where it should.[43] The International Civil Aviation Organization recommends that ePassports have a validity of five years. Although some countries such as Sweden have decided to reduce passport validity to this level, the Identity and Passport Service maintained the UK adult passport validity at ten years because it believed that increasing the frequency of passport replacement would impose an undue fee burden on the public and put pressure on production processes. The Identity and Passport Service is keeping this issue under review.

3.6 An ePassport remains a valid travel document even if the electronic chip fails. If failure is detected at border control, the holder will be issued with a letter advising them to contact the issuing authority. The Identity and Passport Service will examine any faulty ePassports returned to it and, where it concludes the chip unit contains a manufacturing fault, the ePassport will be replaced free of charge. In instances where the chip cannot be read, secondary border control screening measures need to be in operation to maintain the increased security offered by the implementation of ePassports.

Critical staff and institutional memory are at risk of being lost

3.7 The passport – previously a paper product – now has technically complex components, and a new set of skills has been required to deliver it. The Identity and Passport Service brought in technically qualified staff to help deliver these aspects of the project. The Identity and Passport Service told us these staff had to be retained on a consultancy basis because the civil service pay structure did not enable their recruitment as permanent staff. We found that, in addition to technical consultants, project management and other less specialist skills were also being retained on a consultancy basis.

40 Clark D., *'PKI and Public Key Directory – an ICAO Program for ePassport Security'*, ICAO MRTD Report, Vol. 1, No. 1, 2006.
41 Approximately 10,000 individuals.
42 The Australian Smartgate trial results from 2003 found two per cent of the 4,400 users were incorrectly rejected as being themselves and less than one per cent of users were falsely identified.
43 This is particularly the case in the young and very old age groups.

3.8 Between May 2003 and the end of November 2006, £4.9 million had been spent on full time consultants and a further £322,000 on fixed-term contractors working on the ePassports project. This compares with £82,000 spent on permanent staff. In addition, £2.1 million was spent on legal and accountancy advisers who were employed, in part, to drive down the costs of the main supplier contract. Of the £4.9 million spent on full time consultants, 39 per cent was spent on technical specialists with the remaining 61 per cent being spent on consultants in project management, business analyst and other business support roles.

3.9 The use of technical consultants has undoubtedly contributed to the completion of the project on time, to budget and to quality standards. However, the Identity and Passport Service's reliance on technical consultants is a risk for the business as it moves into follow-on projects such as second generation ePassports and identity cards. Consultants are not only more expensive but are also more difficult to retain than permanent staff. The loss of institutional knowledge built up during the first generation ePassport project is a risk to the success of the Identity and Passport Service's future projects.

3.10 The reason for the Identity and Passport Service's use of consultants for project management, analytical and administrative tasks is less clear because these skills could be developed by civil servants. Although the ePassports team was a temporary team, a number of new teams of similar size and skills will need to be established in order to deliver the Identity and Passport Service's future plans. We calculated the actual monthly cost of interim staff performing project management, analysis and administrative tasks on the ePassport project and compared it to the civil service pay rates for equivalent grades, and estimate that at least £3.5 million could be saved over the next five years if such roles were held by civil servants rather than consultants. The Identity and Passport Service needs to employ more permanent staff in such roles and is seeking to do so, although it argues there are difficulties attracting and retaining staff at civil service rates of pay.

The Identity and Passport Service intends to compete the next contract for ePassport production

3.11 The Identity and Passport Service's main production contract with Security Printing and Systems Limited will end in October 2010. The creation of a reserve facility and the Identity and Passport Service's ownership of production equipment give it the option to develop an in-house solution after 2010. However, the marketplace for potential suppliers although still constrained has grown since the ePassports project began, and the Identity and Passport Service intends to hold an open competition for the subsequent production contract.

The ePassport fee could rise in the future

Chip units are guaranteed for only two years, leaving Identity and Passport Service vulnerable to returns

3.12 Given the innovative nature of its product, Philips Semiconductors' initial warranty for the chip units was for 12 months even though the Identity and Passport Service had sought a ten-year warranty to match the lifespan of the passport. The warranty was subsequently increased, first to 18 months and then to 24 months. If the chip unit does not prove durable enough to last the ten-year life of a passport this could leave the Identity and Passport Service vulnerable to a high number of returns. The Identity and Passport Service has sought to protect itself and the taxpayer by requiring Security Printing and Systems Limited to remedy any problem which occurs within the warranty period.

The Identity and Passport Service did not fund the research and development costs for the chip and antenna

3.13 Owing to its development of the chip and involvement in the international committees that set technical standards, Philips Semiconductors holds many of the intellectual property rights in the chip unit. The Identity and Passport Service has been aware of this issue since the outset and has sought to pinpoint where intellectual property rights and patents reside given the evolving nature of requirements. The Identity and Passport Service is employing legal advice to assess its position on this issue. In particular, the Identity and Passport Service is seeking to quantify the risk of possible patent infringement and assess any possible costs arising. Security Printing and Systems Limited holds other key intellectual property rights but the Identity and Passport Service has protected its position by inserting a clause in the amended agreement allowing it to use Security Printing and Systems Limited patents under licence after the contract expires.

Planned future developments will require adjustments to current processes

3.14 In August 2006, the Identity and Passport Service established a project (which is still ongoing) to design, develop and procure the manufacture of second generation ePassports incorporating fingerprints. When developing the first generation UK ePassport, the Identity and Passport Service sought to avoid hindering future developments such as identity cards and the addition of fingerprints to the next generation of ePassports by choosing an ePassport chip with 72 kilobytes of data capacity. This exceeds the 32 kilobyte capacity required by the International Civil Aviation Organization.[44] However, although there is spare capacity on the chip to store two fingerprints, the current model of chip has insufficient capability to accommodate the enhanced operating system and electronic key infrastructure required to protect fingerprint data.[45] While the Identity and Passport Service believes that existing production lines will only require minor modifications in order to insert a larger capacity chip into the ePassport and load data onto it, the costs of production line modifications, the enhanced operating system and larger capacity chips are currently unknown. Consequently, the impact on the passport fee is unclear. Electronic readers at UK ports will also require an upgrade in order to read second generation ePassports and the cost of this enhancement is likewise unknown. The European Union passport regulation, with which the UK voluntarily complies, will require the data page to be moved from its current position in the book when second generation ePassports are introduced. Significant expenditure will be required to make the necessary modifications to the production line. This regulation was introduced after the order for ePassport production line machinery was made.

3.15 The incorporation of fingerprints into second generation ePassports presents data capture challenges. While passport photos can be submitted by post, fingerprints can only be taken from individuals in person. When second generation ePassports are introduced the Identity and Passport Service intends to collect applicants' fingerprints at the 69 Authentication by Interview regional offices. The Foreign & Commonwealth Office informed us that, given the likelihood of applicants for second generation ePassports being required to apply in person, significant changes to the processing of applications received overseas would be required. A strategy has been agreed and work started on a new Foreign & Commonwealth Office programme (Passports NG) to deliver these changes by 2010.

44 The International Civil Aviation Organization recommends that nations work towards using chips with a total memory of 512 kilobytes to facilitate future-proofing by offering over 256 kilobytes of data space; ICAO Technical Advisory Group, Machine Readable Travel Documents/New Technologies Working Group Technical Report, *Biometrics Deployment of Machine Readable Travel Documents*, Version 2.0, 21 May 2004, pages 36 and 37.

45 Unlike facial images, fingerprints are classified as 'personal data' and the International Civil Aviation Organization requires them to have a higher degree of security protection, known as Extended Access Control.

APPENDIX ONE

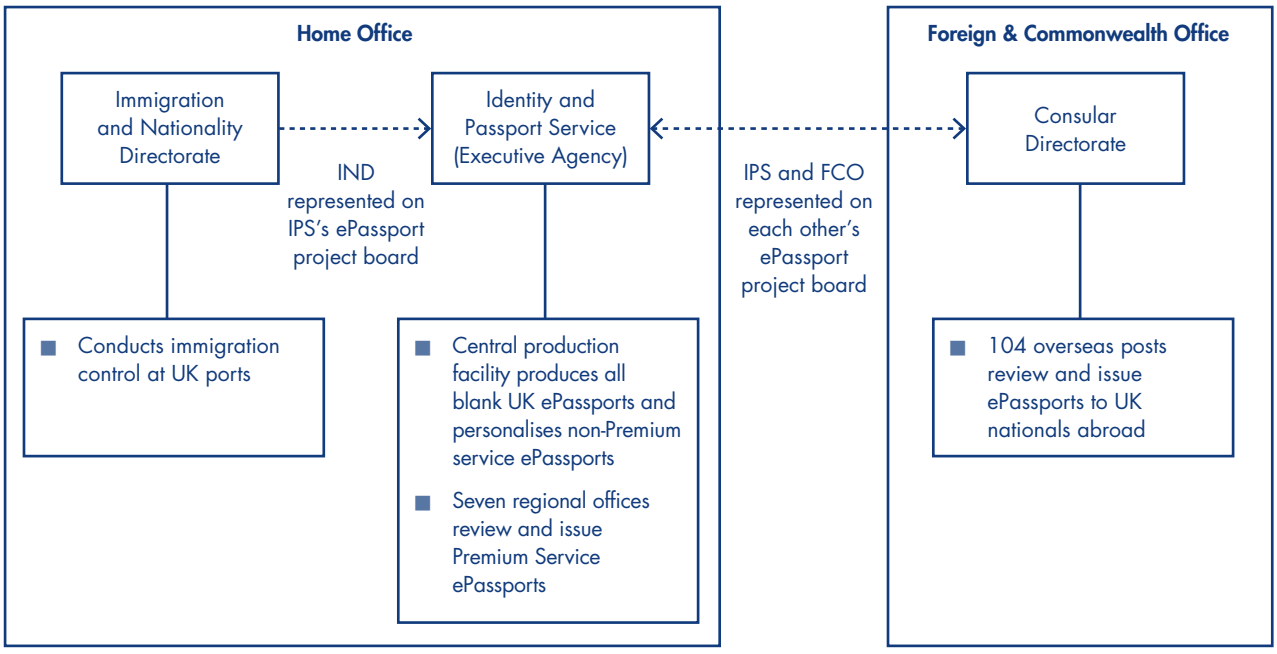
Identity and Passport Service

1 The Identity and Passport Service was established on 1 April 2006 to issue passports and identity cards, and deliver and promote the use of the national identity scheme. The Identity and Passport Service is the successor organisation to the UK Passport Service.

2 There are around 48 million passport holders in the UK and 80 per cent of the eligible population holds a passport. In 2005, 6,390,000 passports were issued from the UK. An estimated further 450,000 were issued by Foreign & Commonwealth Office overseas posts in 2005-06. Links between the Identity and Passport Service, the Foreign & Commonwealth Office and the Immigration and Nationality Directorate are shown in **Figure 7**.

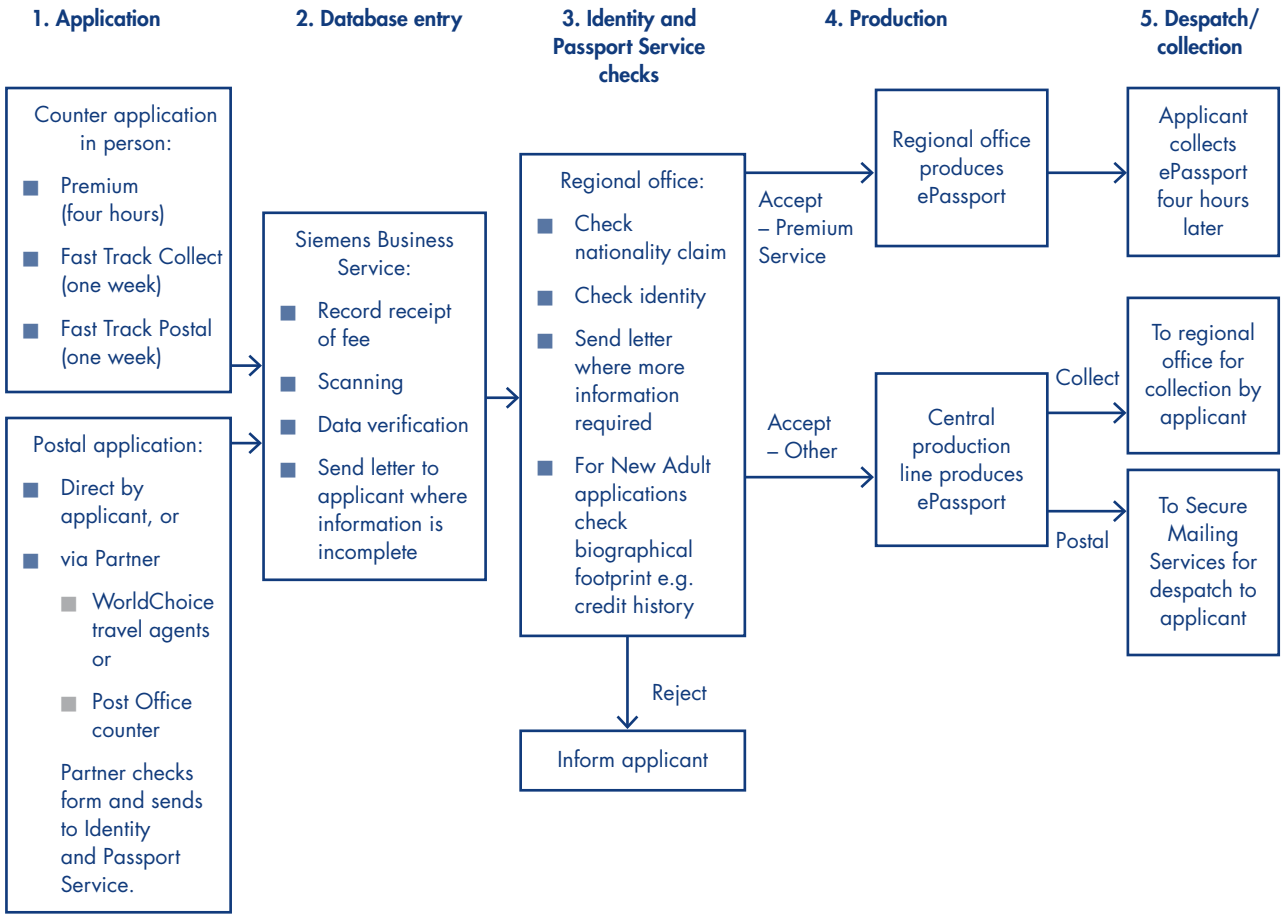
3 The Identity and Passport Service's central production line manufactures all the UK's blank ePassports and personalises around 90 per cent of them. The remaining ten per cent are personalised either at one of the Identity and Passport Service's seven regional offices (London, Durham, Peterborough, Liverpool, Glasgow, Newport or Belfast) or by the Foreign & Commonwealth Office at one of its 104 overseas posts. The Identity and Passport Service's regional offices mainly deal with Premium applications for which there is a four-hour turnaround time. **Figure 8 overleaf and Figure 10 on page 24** summarise the passport application and production processes. **Figure 11 on page 24** shows how it is intended the new ePassport will eventually be read at border control.

7 Links between UK government departments involved in issuance and use of ePassports



Source: National Audit Office

8 Overview of passport application process



Source: National Audit Office based on interviews with Identity and Passport Service staff

4 The Identity and Passport Service produces passports in partnership with:

- Security Printing and Systems Limited which produces and personalises the passport book. In 2003, when the decision was taken to proceed with the ePassport project, the Identity and Passport Service and Security Printing and Systems Limited were part-way through a contract for the production of digital passports agreed in October 1998.
- Siemens Business Services, which processes passport applications and manages the Passport Application Support System database. This contract runs until 2008.

5 Although passport issuing is intended to break-even rather than make a profit or loss, the Treasury gave permission for the Identity and Passport Service to plan to make a £15 million surplus in 2005-06 and a corresponding £15 million deficit in 2006-07 in order to smooth the difference between costs and fee income during the transition to ePassports **(Figure 9)**.

9 Identity and Passport Service forecast financial outturn

	2005-06 £ million	2006-07 £ million
Income from passport fees	307	388
Expenditure:		
Passport issuing	(240)	(350)
FCO consular expenditure	(52)	(53)
Surplus/deficit	**15**	**(15)**
Number of passports produced (2005-06 actual, 2006-07 predicted)	6,918,000	6,910,000
Average unit cost per passport[1]	£42.21	£58.32

Source: Identity and Passport Service Corporate and Business Plans, 2006-2016

NOTE

1 The average unit cost per passport is calculated by dividing the total expenditure by the number of passports produced. A number of differently priced services are available for both adult and child passports, of which this figure is the average cost.

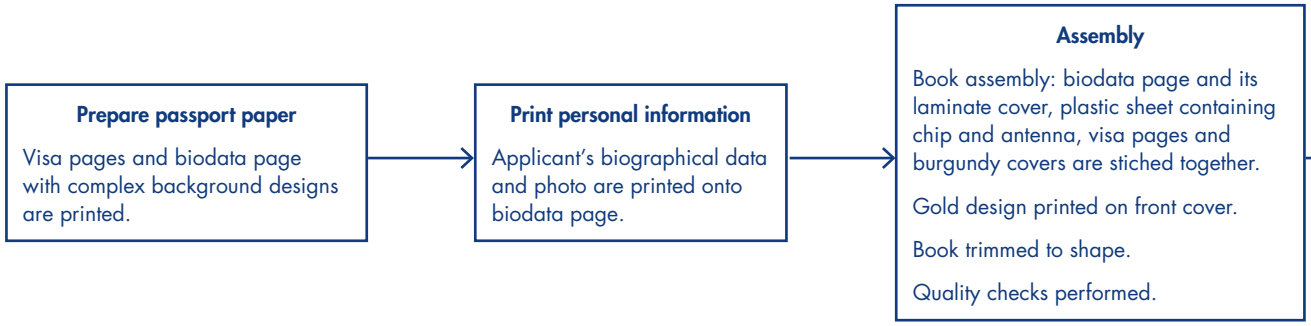
The ePassport project is part of the Identity and Passport Service's wider programme to improve the security of passports

6 The Identity and Passport Service's ePassport project is part of a programme called 'Operations 2006' which is intended to improve the security of British passports and ensure they meet international requirements **(Figure 12 on page 26)**. The other elements of the programme are: interviewing new passport applicants to authenticate their identity; checking applicants' 'biographical footprint' against sources such as the electoral roll and credit histories; and a validation service for government departments and other organisations (such as financial services companies) to check the authenticity and validity of passports. The ePassport Reserve Facility project (in case of disaster at the main production site) is also part of the Operations 2006 programme. The UK passport design will be updated typically every five years, and further projects are planned including the incorporation of a second identifier (fingerprints) in the next generation of ePassports.

Lessons learned

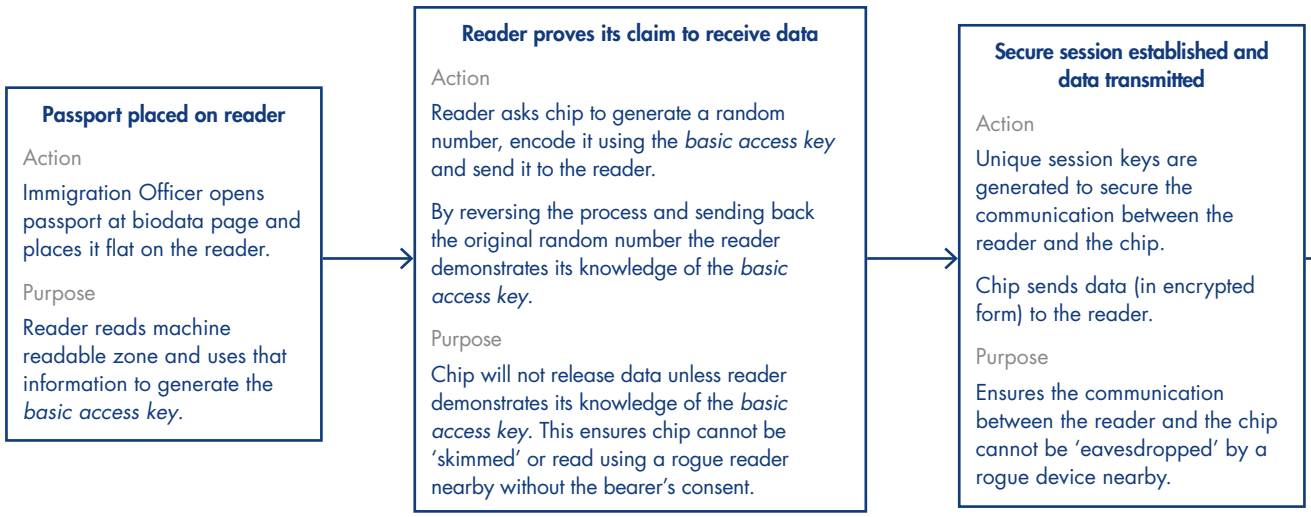
7 The Identity and Passport Service identified a number of lessons and examples of best practice following the ePassport project that it intends to take forward as standard procedure on all Identity and Passport Service projects, as shown in **Figure 13 on page 26**.

10 Central ePassport production

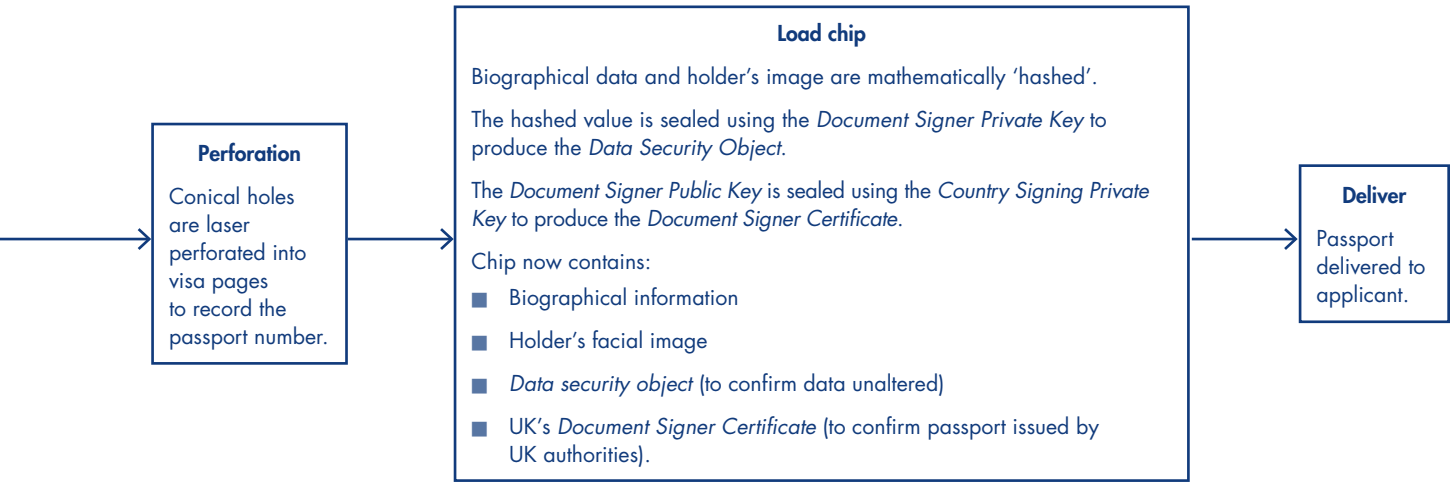


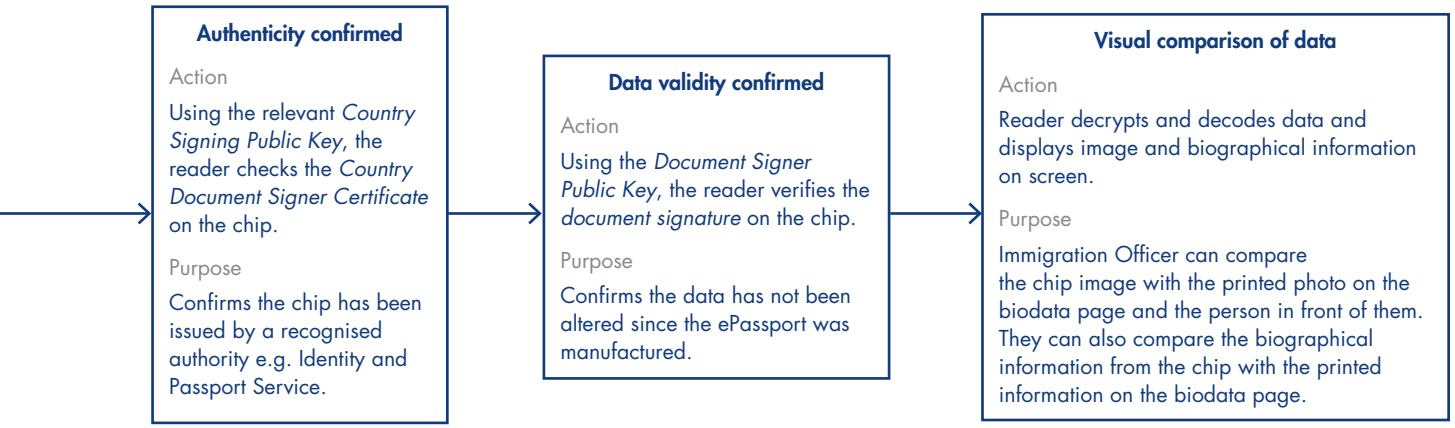
Source: National Audit Office based on document review and interviews with Identity and Passport Service staff

11 Intended process for reading a first generation ePassport at border control (not yet in operation)

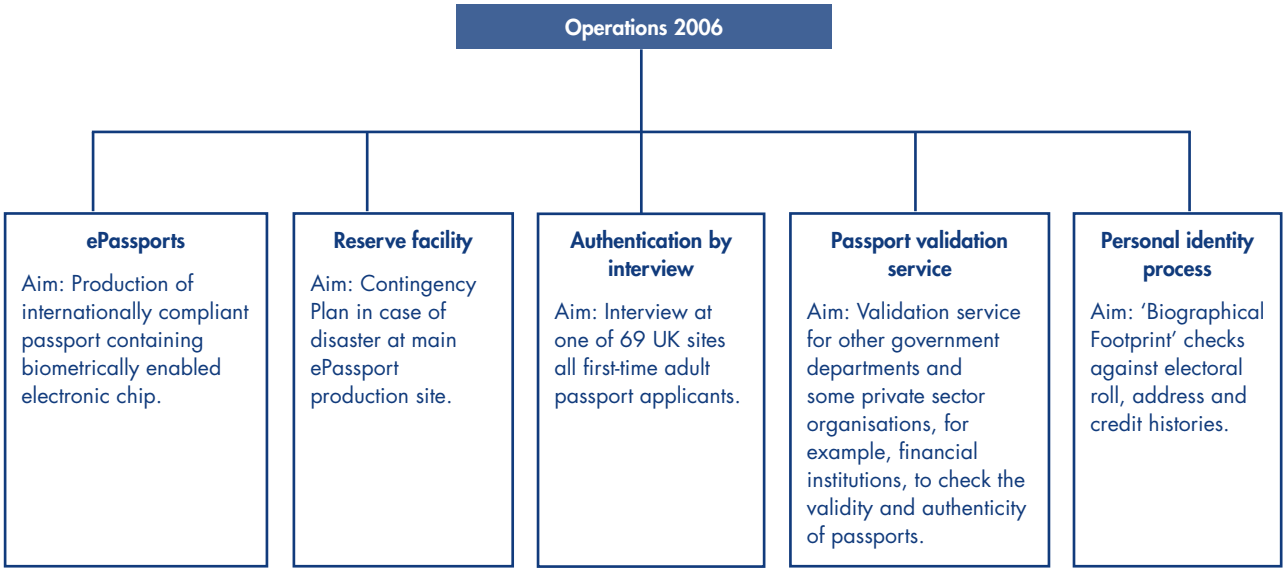


Source: National Audit Office based on document review and interviews with Identity and Passport Service staff


Perforation
Conical holes are laser perforated into visa pages to record the passport number.
Load chip
Biographical data and holder's image are mathematically 'hashed'.
The hashed value is sealed using the Document Signer Private Key to produce the Data Security Object.
The Document Signer Public Key is sealed using the Country Signing Private Key to produce the Document Signer Certificate.
Chip now contains:
Biographical information
Holder's facial image
Data security object (to confirm data unaltered)
UK's Document Signer Certificate (to confirm passport issued by UK authorities).
Deliver
Passport delivered to applicant.


Authenticity confirmed
Action
Using the relevant Country Signing Public Key, the reader checks the Country Document Signer Certificate on the chip.
Purpose
Confirms the chip has been issued by a recognised authority e.g. Identity and Passport Service.
Data validity confirmed
Action
Using the Document Signer Public Key, the reader verifies the document signature on the chip.
Purpose
Confirms the data has not been altered since the ePassport was manufactured.
Visual comparison of data
Action
Reader decrypts and decodes data and displays image and biographical information on screen.
Purpose
Immigration Officer can compare the chip image with the printed photo on the biodata page and the person in front of them. They can also compare the biographical information from the chip with the printed information on the biodata page.

12 Overview of projects run by the Identity and Passport Service



Source: National Audit Office based on review of Identity and Passport Service documents

13 Lessons and best practice examples identified by the Identity and Passport Service for implementation on future projects

Project scope should be **clearly defined** and agreed by all parties at project initiation. Project priorities should be managed through a programme level plan which identifies potential conflicts in resources and implementation schedules.

Regular meetings should be held with external stakeholders and senior Identity and Passport Service staff to encourage collaborative working, the sharing of resources between stakeholders and to allow the impact of proposed solutions to be assessed and planned for accordingly.

Appoint **dedicated Operational Change Manager(s)** to manage the transition between the project team and the rest of the business, and to manage change within Identity and Passport Service regional offices.

Agree **realistic contingency plans** with business owners in advance to ensure a minimal impact on operations should it become necessary to implement them.

Manage all changes to project scope and business requirements through a **change control process**. Contract changes should be discussed with relevant stakeholders before their acceptance. The process should include an impact assessment of changes to scheduled events where appropriate. 'Contract Summaries' should be used to communicate changes for non-commercial staff.

Ensure Identity and Passport Service and suppliers' **responsibilities are clear** in contracts and well understood. This includes test and quality assurance criteria, subcontract management and product acceptance processes.

Project staff should retain responsibility for managing **communication between Identity and Passport Service and suppliers**. Where multiple stakeholders exist their requirements should be managed through a single point of control.

Source: 'ePassport project status update and lessons learned report', Identity and Passport Service

APPENDIX TWO

Methodology

1 This study set out to examine whether the project to introduce ePassports had been well-managed. Within this scope we considered:

- whether the project had been delivered on time and to budget;
- whether the resulting design was of appropriate quality both in terms of meeting international standards for ePassports and compatibility with international ePassport readers;
- the steps the Identity and Passport Service had taken to secure value for money in the production of ePassports; and
- the extent to which the Identity and Passport Service liaised with the Immigration and Nationality Directorate and the Foreign & Commonwealth Office which were charged with implementing related projects.

Document review

2 We reviewed key documentation including several versions of the ePassports business case, the procurement strategy, statement of requirements, minutes of negotiations, implementation plans, supplier contracts, risk registers and Gateway Review reports. We used the documents to establish the sequence of events in the ePassport project and identify the extent to which the Identity and Passport Service considered other options to meet policy objectives and was constrained by external factors. We used the latest version of the business case (February 2006) to provide the budget for the project costs. We considered whether value for money had been achieved in procurement and project management and also considered how well the Identity and Passport Service responded to unexpected events during project implementation.

Interviews with key officials and passport production review

3 We conducted 34 semi-structured interviews with staff from the Identity and Passport Service, the Foreign & Commonwealth Office, the Immigration and Nationality Directorate, Security Printing and Systems Limited, Siemens Business Services, Philips Semiconductors, and Field Fisher Waterhouse, legal advisers to the Identity and Passport Service. Interviewees included those with responsibility for overall delivery of the project, supplier management, risk management, technical testing and finance. Interviewees were of mixed seniority and our questions focused on the planning and delivery of the ePassport project. We also sought to understand the nature of the Identity and Passport Service's engagement with its partners and to locate the ePassports project within the wider context of related projects. We visited the main production line, two regional production offices at Durham and Peterborough, and the British Consulate in Madrid where ePassports are produced to understand the particular issues associated with producing ePassports on a small scale at regional offices and overseas.

Cost and budget analysis

4 We analysed cost and budget information to:

- test the assumptions made in the cost/benefit analysis supporting the case for the introduction of ePassports; and
- establish the costs of the project and compare actual project costs with budgeted costs.

Use of consultants

5 Following competitive tender we selected Deloitte & Touche LLP to help us assess how well the Identity and Passport Service dealt with technical issues during planning and project management. Identity management expertise was provided by Ryan Rubin, and Bori Toth joined the review team as a biometric technology specialist. The draft report was also reviewed and commented on by Simon Prince of University College London.

International comparisons

6 Using our contacts at other Supreme Audit Institutions, we gathered information on the progress of ePassport projects in other countries. The results are shown in Appendix 4.

APPENDIX THREE

The Identity and Passport Service's amended agreement with Security Printing and Systems Limited

Amended agreement negotiations

- PricewaterhouseCoopers LLP was employed to create a cost model that was used to negotiate a reduction in the cost of the amended agreement.
- Negotiations reduced Security Printing and Systems Limited's proposed rate of profit.
- Acceptable production wastage levels were negotiated down by more than half.[46]
- Owing to going-concern fears relating to Security Printing and Systems Limited's parent company, bankers' and parent company guarantees were obtained to protect the Identity and Passport Service's contract with Security Printing and Systems Limited.
- A number of stepped remedies are available to the Identity and Passport Service in the event that Security Printing and Systems Limited fails to meet its contractual obligations.

Terms and conditions

- Service Level Agreements requiring Security Printing and Systems Limited to produce ten per cent of personalised ePassports within 24 hours and the remainder within 48 hours.
- Key milestones were defined in the amended agreement and payment linked to their achievement.
- Security Printing and Systems Limited is incentivised to reduce wastage by receiving a percentage of the costs saved if average wastage over the course of the amended agreement is below target.
- Significant termination charges exist to discourage Security Printing and Systems Limited from ending the contract early.
- The Identity and Passport Service secured a clause to ensure that for every penny rise or fall in the average price of the chip unit over the course of the amended agreement, the cost of the ePassport would rise or fall by a larger sum.
- Given the lack of competition, the amended agreement required Security Printing and Systems Limited to open its accounting books and records to the Identity and Passport Service upon request.
- Security Printing and Systems Limited is required to source chips from a second supplier as soon as one is available.
- If the chip unit warranty is breached in a substantial number of passports, Security Printing and Systems Limited is required to put a plan in place to remedy the situation.
- Security Printing and Systems Limited must repay the cost of any equipment paid for by the Identity and Passport Service where its value has not been demonstrated through successful on-site tests.
- Security Printing and Systems Limited 'topped up' liability limits on the chip available from Philips Semiconductors.

46 To deter forgery, passports are designed to be hard to manufacture. Although the central production line uses technically advanced bespoke machinery, the paper constituent of the passport limits the extent to which wastage can be reduced because paper expands or contracts depending on temperature and humidity, introducing an element into the manufacturing process that is difficult to control. The detailed analysis of costs underpinning the contract needed to recognise a level of inevitable wastage in the passport production process, hence the clause on acceptable wastage levels. It is in Security Printing and Systems Limited's interest to reduce waste since this helps it meet its Service Level Agreement turnaround times. Security Printing and Systems Limited is further incentivised to reduce wastage by a clause permitting it to retain a proportion of any savings if wastage falls below agreed levels.

Contract oversight

- The Identity and Passport Service appointed risk coordinators and joint with Security Printing and Systems Limited maintained joint risk registers and risk management plans.
- The Identity and Passport Service altered the amended agreement to improve chip security in line with evolving international standards and technological improvements.
- By January 2005, Security Printing and Systems Limited was not prepared to invest further funds prior to signature of the amended agreement, so the Identity and Passport Service made advance payments to Security Printing and Systems Limited in order to allow the procurement of production line machinery to continue.
- The Identity and Passport Service observed the acceptance testing of production machinery at the manufacturer's factory in Japan.
- Project managers used PRINCE 2 project management software.
- A clear audit trail was maintained of changes to processes and security arrangements.
- The Identity and Passport Service observed the negotiations between Security Printing and Systems Limited and Philips Semiconductors.

APPENDIX FOUR International comparisons

1 There are believed to be 900 million passports held worldwide, with an estimated 125 million being issued or renewed every year. More than 50 countries have now announced their intention to produce ePassports in the near future. They represent around 50 per cent of the world's population and most of the world's international travellers.

2 We surveyed the Supreme Audit Institutions of 32 other nations about their ePassports and received 19 responses. Direct comparison of ePassport fees is difficult because some fees are state-subsidised while others, like the UK, are not. ePassports can vary in validity which is most commonly set at five or ten years. ePassport fees also vary by country because of differing raw material costs, e.g. paper, ink, materials, premises and staffing. The existence of 'state printers' in some countries (such as Germany and Austria) which are wholly owned by the issuing government and produce passports without the need for tendering or other commercial considerations also hampers straightforward comparison. Finally, the UK ePassport fee includes £9.65 to cover consular services abroad whereas most countries fund their embassies directly.

3 Table 1 compares the UK ePassport fee to the nine other comparable ePassport fees for which we received data. It shows that the UK ePassport is mid-priced compared to the ten-year equivalent price for other ePassports that are, like the UK, intended to cover their own costs. Table 2 shows the full survey responses.

TABLE 1

Comparison of the UK ePassport fee with the ten-year equivalent price for other ePassports which like the UK, are not state-subsidised

Country	Standard adult ePassport fee	Passport validity (years)	Equivalent cost over ten year period
Greece	£52	5	£104
New Zealand	£52	5	£104
Norway	£80	10	£80
Portugal	£40	5	£80
Japan	£72	10	£72
United Kingdom	£66	10	£66
Sweden	£29	5	£58
Austria	£46	10	£46
Germany	£40	10	£40
Poland	£24	10	£24

TABLE 2

Full Survey Responses

Country	Standard adult ePassport fee	Approximate percentage of eligible population holding a passport	Passport validity in years	Type of identifier used in first generation ePassport	Actual or planned date of production of first ePassport
United Kingdom	£66	80%	10	Face	12 March 2006
Australia	£77 ($193AUD)	37%	10	Face	24 October 2005
Austria	£46 (€69)	75%	10	Face	16 June 2006
Czech Republic	£14 (CZK 600)	Data unavailable	10	Face	1 September 2006
Denmark	£54 (600Dkr)	Data unavailable	10	Face	1 August 2006
Estonia	£19 (450 EEK)	87%	5	Face	Data unavailable
France	£40 (€60)	Not answered	10	Face and fingerprints	April 2006
Germany	£40 (€59)	Data unavailable	10	Face	1 November 2005
Greece	£52 (€76)	50%	5	Face	26 August 2006
Italy (not yet launched)	Current digital passport fee: £31 (€46)	Data unavailable	10	Face and fingerprints	Data unavailable
Japan	£72 (16,000 Yen)	25%	5 or 10	Face	20 March 2006
Lithuania	£12 (60 Litas)	89% (passport or ID card)	10	Face	28 August 2006
Luxembourg	£20 for 5 years, £13 for 2 years (€30 and €20)	100%	2 or 5	Face	28 August 2006
New Zealand	£52 (NZ$150)	Data unavailable	5	Face	September 2005
Norway	£80 (NOK 990)	75%	10	Face	October 2005
Poland	£24 (140 PLZ)	Data unavailable	10	Face	28 August 2006
Portugal	£40 (€60)	About 25%	5	Face image, fingerprints and electronic signature	31 July 2006
Slovenia	£24 (8635 Tolars)	47%	10	Face	28 August 2006
Spain	£11 (€17)	30%	10	Face	28 August 2006
Sweden	£29 (400 SEK)	72%	5	Face	1 October 2005
United States	£51 ($97)	Data unavailable	10	Face	14 August 2006

Source: NAO correspondence with Supreme Audit Institutions of relevant countries except United States' data from US Department of State website

Actual or planned date of 100% production of ePassports	Contactless chip data capacity in kilobytes	Is country a member of US visa waiver scheme?	Will the project cover its own costs or receive state subsidy?	Actual or planned date when ePassport readers become operational at ports of entry
September 2006	72	Yes	Covers own costs	Spring 2007 at fixed ports
24 October 2005	512	Yes	Government funded. Passport fees go to consolidated revenue.	Early 2007
16 June 2006	72	Yes	Covers own costs	August 2006
1 September 2006	72	No	State subsidised	Data unavailable
1 August 2006	32	Yes	Data unavailable	Late 2006 at the largest ports
Data unavailable	Data unavailable	No	State subsidised	Planned for July 2007
July 2006	Not answered	Yes	Partly subsidised	Not answered
1 November 2005	64 or 72	Yes	Covers own costs	Installation began 2004
26 August 2006	72	No	Covers own costs	Data unavailable
Data unavailable	64 minimum	Yes	Intended to cover own costs	Data unavailable
Data unavailable	Not answered	Yes	Covers own costs	Data unavailable
28 June 2009	72	No	State subsidised	Operational at all ports by 2009
28 August 2006	72	Yes	Fee covers cost of document, Government pays administration cost	Luxembourg airport already equipped
4 November 2005	72	Yes	Covers own costs	Data unavailable
October 2005	32	Yes	Covers own costs	Planned for summer 2008
28 August 2006	72	No	Covers own costs	Planned for 28 August 2006
29 August 2006	Data unavailable	Yes	Covers own costs	Start in January 2007
28 August 2006	72	Yes	State subsidised	Data unavailable
Data unavailable	Not answered	Yes	Data unavailable	1 August 2007
1 October 2005	32	Yes	Covers own costs	Data unavailable
Data unavailable	Data unavailable	Not applicable	Data unavailable	Data unavailable

APPENDIX FIVE

International requirements

Relevant requirements	Summary of content	Who it applies to	Notes/Comments
International Civil Aviation Organization documentation, including Document 9303 Part 1: Machine Readable Passports and Annex 9 to the Convention on International Civil Aviation	Aims to achieve international standardization in travel documents by achieving agreement on the following: ■ All states to issue machine readable passports by 1 April 2010. ■ Facial image is primary biometric (optional inclusion of secondary biometric: fingerprint or iris). ■ Electronic data to be stored on a contactless integrated circuit chip with an agreed logical data structure. ■ Public key infrastructure used to detect unauthorised alteration of data; optional use of Basic Access Control to prevent unauthorised access to data. ■ Document holder should be able to view encoded data on request. ■ Recommended ePassport validity of 5 years.	189 contracting states of International Civil Aviation Organization	UK is an ICAO member and also a member of the organisation's Technical Advisory Group on Machine Readable Travel Documents.

United States' Visa Waiver Programme	■ From 26 October 2006, new passports issued by countries participating in the Visa Waiver Program must be ePassports (which include an integrated computer chip capable of storing biographical information and a digitised photograph).
	■ Travellers with a valid passport do not need to get a new passport until the existing one expires so long as it contains:
	  ■ A machine readable zone if it was issued before 26 October 2005; or
	  ■ A machine readable zone and digital photograph if it was issued between 26 October 2005 and 25 October 2006.
		27 countries are members of the Program: Andorra, Austria, Australia, Belgium, Brunei, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, San Marino, Singapore, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.	Compliance is optional but if the UK were to fail to comply, UK passport holders would need to purchase a visa for US travel, (current price $100). The US granted a one-year extension of the original 26 October 2004 deadline in July 2004, giving a new deadline of 26 October 2005. A further one-year extension was granted on 15 June 2005 to give the final deadline of 26 October 2006.

Relevant requirements	Summary of content	Who it applies to	Notes/Comments
European Union regulations 15152/04, 2252/2004	■ Digital passports to be replaced by ePassports containing facial image by 28 August 2006. ■ ePassports to include two fingerprints by June 2009. ■ Basic Access Control is mandatory	EU member states	UK is exempt since it is not a signatory to the Schengen agreement, but has chosen to comply voluntarily.
International Organization for Standardization	Numerous standards relevant to ePassports including: *ISO 2835:1974* Prints and printing inks *ISO 3166:1997-99* Country certificates *ISO/IEC 7810:2003* Physical characteristics of identification cards *ISO/IEC 10536:2000* ID cards – contactless integrated circuit cards *ISO/IEC 14443:2000-01* ID cards – contactless integrated circuit *ISO/IEC 10373:2001-06* Testing methods for identification cards *ISO/IEC 19794:2005-06* Biometric data interchange formats Standards are supplemented by working groups which include: *ISO/IEC JTC 1/SC 37 WG6* Societal issues such as health & safety, accessibility, privacy usability, legal framework, user's acceptance, ethical issues e.g. enrolment of minors, exportability of databases, and measures to avoid misuse of data. *ISO/IEC JTC 1/SC 37 WG1* harmonisation of biometric vocabulary	Any state wishing to accord with EU regulations or International Civil Aviation Organization requirement (see right).	EU and International Civil Aviation Organization documents often refer the reader to International Organization for Standardization standards for a detailed statement of technical requirements.

APPENDIX SIX

Calculation of the benefit to the UK economy

1 Over the course of planning the project, the Identity and Passport Service prepared a number of cost-benefit calculations. The cost-benefit analysis considered at the third Gateway Review in June 2004 estimated the project would involve a net cost to the UK economy of between £100 million and £344 million depending on the chosen solution. By October 2005, the net cost was replaced by an estimated net benefit to the UK of £2.0 billion for the period 2003-04 to 2010-11. The final version of the business case, prepared in February 2006 was the most detailed and sought to quantify just one of the benefits ascribed to ePassports – the UK's continued participation in the US Visa Waiver scheme. This reduced the estimated net benefit to the UK economy to £89 million for the same period. The changes reflect improvements in assumptions and the methodology to make the analysis more robust.

2 We found that many of the assumptions on which this final cost-benefit analysis was based were prudent. The Identity and Passport Service classified as a benefit to the UK economy the cash and time savings arising from UK passport holders not having to obtain a visa for travel to the US. Of 4.2 million annual trips made by UK residents to the US, the analysis assumed that only 24 per cent[47] of trips would require a visa if ePassports were not implemented. The remaining trips were assumed to be made either by frequent flyers already holding a visa, or by US nationals or nationals of another Visa Waiver country already in possession of an ePassport (neither of whom would require a visa). In addition to the $100 visa fee saved (which was assumed to equate to £65), the analysis also assumed half an hour of time would be required to obtain a visa. Both of these assumptions are likely to be underestimates. Other stated benefits which the Identity and Passport Service might have tried to quantify were a reduction in fraudulent passport applications and a reduction in benefit fraud perpetrated using a fraudulent passport.

3 The analysis did not take into account, however, the related costs incurred by the Foreign & Commonwealth Office to implement ePassports overseas (£3.7 million) and the Immigration and Nationality Directorate to upgrade readers at UK ports (£1.4 million).

4 It also assumed that a US visa would be valid for a year. However, US visas can be valid for up to ten years depending on the remaining validity of the holder's passport. If US visas are assumed to be valid for an average of five years and other assumptions are held constant, the assumed percentage of trips requiring a visa would fall to 11 per cent and would result in a net cost to the economy between 2003-04 and 2010-11 of £98 million.

5 The analysis also used the end-date of the Security Printing and Systems Limited contract as the cut-off point for the period over which costs and savings were calculated. Production of the next generation of ePassports is planned to begin in 2009 and it is not certain yet what level of adjustments to the production process this will entail. If significant changes are required, it would be more appropriate to use the end of production of the first generation ePassport – 2009 – as the end-date for the analysis.

47 After elasticities of demand had been accounted for.

6 In line with Treasury guidance the business case included a 'do-nothing' option but it did not explore other alternatives such as introducing ePassports at a later date. Waiting for international standards to develop and for the number of suppliers to increase could have made a competitive tender possible. In the event, however, the market is still constrained. Our reworking of the cost-benefit analysis, using the same original assumptions, shows a benefit to the UK economy of only £3.6 million if the introduction of ePassports had been delayed until 2007-08. The Identity and Passport Service also argues that, had the UK failed to produce ePassports by 26 October 2006 and therefore been ejected from the United States' Visa Waiver Program, there was a risk we would not have been readmitted to the Program at a later date.

APPENDIX SEVEN

Follow-up on previous Public Accounts Committee recommendations

This appendix outlines some of the recommendations made by the Public Accounts Committee in its 24th report of 1999-2000, *The Passport Delays of Summer 1999*, its 45th report of 2003-04, *Criminal Records Bureau: delivering safer recruitment?*, and its 39th report of 2005-06, *Consular services to British nationals*. It compares the experience of the ePassport projects in these areas.

The Passport Delays of Summer 1999

Public Accounts Committee conclusion	Experience on ePassports
iii) "[T]esting and initial implementation raised questions… which were not adequately resolved… We [also] emphasise the importance of sound risk management arrangements."	Testing was based on an end-to-end approach whereby major processes and production equipment was subject to a rigorous test and evaluation regime. The management of risk on the project was sound with risk coordinators appointed in 2004. Risk registers, including those held with contractors, and risk management plans were revised periodically.
vi) "The Home Office's forecast of 5.1 million passport applications in 1999 was well short of the 5.6 million actually received… The Home Office is expected to act on their commitment to improve their forecasting."	Between 1 January 2006 and 6 August 2006, the Identity and Passport Service's forecast of 5 million passport applicants was above the 4.6 million actually received.
vii) "The Agency's contingency planning proved wholly inadequate… We emphasise the need for adequate contingency plans in key public services."	Risk management has been tight while contingency planning in the event of a disaster at the main production site has been met by the building of the Reserve Facility, which is the most cost-effective solution to this issue.

Criminal Records Bureau: delivering safer recruitment?

Public Accounts Committee conclusion	Experience on ePassports
i) "Timetables for the development and implementation of new services should provide for sufficient in-depth consultation directly with potential users of the service, and for the outcome of consultation to be reflected in service design".	Because of a tight project timescale and evolving technical standards, it was difficult to establish a definitive requirement. End users were consulted on the planned use of public readers but not on any other aspects of the project.
iii) "Adequate time for piloting new services is fundamental to successful introduction".	Central production was piloted and actual production gradually built up by Security Printing and Systems Limited. The ability to revert to digital production was retained in case of failure. The initial pilot for ePassports was carried out at the Durham regional office in December 2005. It was then piloted at the other offices on an iterative basis in the first half of 2006 in advance of the roll-out at each office.
v) "If business assumptions change fundamentally during service development, Departments should consider whether to continue with their current contractor or test the market again".	Having decided to amend the contract with Security Printing and Systems Limited, changes to the project timetable occurred too late for the Identity and Passport Service to reconsider its procurement strategy.

Consular services to British nationals

Public Accounts Committee conclusion	Experience on ePassports
ix) "Issuing passports at over 100 posts is inefficient… The Department should analyse the costs and benefits of repatriating large elements of passport work to take advantage of the economies of scale and quality assurance arrangements of the [Identity and] Passport Service."	The Foreign & Commonwealth Office is reviewing its overseas passports issuing operation. By 2010 it is expected that passport production will have been significantly rationalised either to three overseas 'super-hubs' or to a central production site alongside the Identity and Passport Service in the UK.

APPENDIX EIGHT

Glossary of acronyms and terms

Authentication	Authentication seeks to verify that people are who they say they are. At a border post, a traveller makes an identity claim by handing over a passport to the Immigration Officer. In the case of an ePassport, the official can verify this claim by comparing the biographical information stored on the chip with information printed on the biodata page, and also by comparing the printed and stored facial images with the face of the claimant.
Authentication by Interview	An Identity and Passport Service project involving the procurement of 69 local offices, initially to verify the identity of first-time adult passport applicants and eventually all passport applicants, through personal interviews.
Basic Access Control	A security feature used in some ePassports (including the UK's) which protects against skimming and eavesdropping while an ePassport is being read.
Biometrics	From the Greek words 'bios' and 'metron' meaning 'life measurement'. The term refers to a group of technologies used for fully automated recognition of a person based on physiological (e.g. face, iris, fingerprints) or behavioural (e.g. signature dynamics, voice) characteristics.
Digital signature	A technical feature to secure digital contents using encryption techniques. Verifying a digital signature makes it possible to identify the issuing authority and to say whether or not the protected contents have been altered since the time of issue.
Digital passport	A passport containing a machine readable zone and a printed photo of the holder rather than one that is pasted in.
Electronic passport (ePassport)	A digital passport which also contains a contactless chip storing biographical information and biometric identifiers.
Electronic passport reader	An electronic device capable of energising and communicating with the contactless chip within an electronic passport.
Gateway Review	Acquisition programmes and procurement projects in central civil government are subject to Gateway Reviews by the Office of Government Commerce which examines a programme or project at critical stages in its lifecycle to provide assurance it can progress successfully to the next stage.
International Civil Aviation Organization (ICAO)	A United Nations body created in 1944 with 189 contracting member states that seeks to promote cooperative regulation in aviation including international travel documentation.
Identification	Identification answers the question 'who are you?' without the need for any prior claim to identity. Identity is established by comparing a physical or behavioural characteristic to all existing entries in a register.

Identity cards	UK identity cards as currently envisaged would contain the cardholder's biometric identifers and identity details on a contactless chip. These identity details and the biometrics would also be stored on the National Identity Register.
International Organization for Standardization (ISO)	A worldwide federation of national standards bodies from 157 countries producing world-wide industrial and commercial standards.
Logical data structure	The internationally agreed structure for the arrangement of data on ePassport contactless chips.
Machine readable zone	Two lines of unique computer-readable text containing letters and symbols found at the bottom of a passport's biodata page. The zone contains the following information: name; passport number; nationality; date of birth; sex; passport expiry date; and check digits to facilitate Basic Access Control.
National Identity Register	A planned database intended to securely retain the biometric identifiers and personal identity information of people to whom identity cards have been issued.
Personalisation	The process of inserting personal data within a passport either in printed or electronic form.
Personal Identity Process (PIP)	An Identity and Passport Service project which aims to check the 'biographical footprint' of first-time adult applicants using credit history and electoral roll information.
Public Key (Cryptography)	Sophisticated mathematics is used to generate 'key pairs' that secure electronic data by enabling the verification of data as genuine and the detection of unauthorised changes to data. The key pairs are asymmetric, each comprising one public key and one private key. Private keys are highly secret and are used to digitally sign or encrypt information. Public keys are made available around the world to relevant parties via the Public Key Directory. They are used to verify digital signatures or to de-crypt information. While public keys are mathematically related to their private key pair, it is impossible to derive a private key from a public key.
Passport Validation Service (PVS)	An Identity and Passport Service project which offers government departments and selected private organisations the opportunity to check the authenticity and validity of a British passport.
Reserve facility	A contingent passport production site, which would become operational should the main production site become inoperable.
Radio Frequency Identification chip (also known as contactless chip)	An electronic chip capable of storing data in an electronic form, and communicating that data when placed near an appropriate electronic reader. Contactless chips are used in ePassports to store biographical information and biometric identifiers.

Schengen Agreement	Belgium, France, Germany, Luxembourg and the Netherlands, agreed on 14 June 1985 to gradually remove controls at their common borders and introduce freedom of movement for their nationals. Italy, Spain, Portugal, Greece, Austria, Finland, Sweden and Denmark (under a special arrangement), Iceland and Norway (non-Community countries with a limited role in decision taking) have since joined the agreement. The ten new EU member states have also adopted Schengen. Ireland and the UK are only partial participants in Schengen, since their border controls have been maintained.
Security Printing and Systems Limited	The Identity and Passport Service's contractor responsible for printing all UK ePassport blank books and personalising over 94 per cent of them.
US Enhanced Border Security and Visa Entry Reform Act	Act passed in 2002 by US Congress with the aim of enhancing the border security of the United States.
US Visa Waiver Program	United States' government initiative enabling nationals of certain countries to travel to the US for tourism or business for periods of up to 90 days without obtaining a visa.

Printed in the UK for the Stationery Office Limited
on behalf of the Controller of Her Majesty's Stationery Office
5472553 02/07 7333

Layout and production by
NAO Information Centre
DG Ref: 6914VB

This report has been printed on Consort Royal Silk and is produced from a combination of ECF (Elemental Chlorine Free) and TCF (Totally Chlorine Free) wood pulp that is fully recyclable and sourced from carefully managed and renewed commercial forests. The range is manufactured within a mill which is registered under the BS EN ISO 9001 accreditation, which provides the highest standard of quality assurance.

Published by TSO (The Stationery Office) and available from:

Online
www.tso.co.uk/bookshop

Mail, Telephone, Fax & E-mail
TSO
PO Box 29, Norwich NR3 1GN
Telephone orders/General enquiries 0870 600 5522
Fax orders 0870 600 5533
Order through the Parliamentary Hotline
Lo-call 0845 7 023474
E-mail book.orders@tso.co.uk
Textphone 0870 240 3701

TSO Shops
123 Kingsway, London WC2B 6PQ
020 7242 6393 Fax 020 7242 6394
16 Arthur Street, Belfast BT1 4GD
028 9023 8451 Fax 028 9023 5401
71 Lothian Road, Edinburgh EH3 9AZ
0870 606 5566 Fax 0870 606 5588

The Parliamentary Bookshop
12 Bridge Street, Parliament Square,
London SW1A 2JX
Telephone orders/General enquiries 020 7219 3890
Fax orders 020 7219 3866
Email bookshop@parliament.uk
Internet www.bookshop.parliament.uk

TSO@Blackwell and other Accredited Agents

£13.50

9 780102 944365

Identity and Passport Service: Introduction of ePassports

A report by the Comptroller and Auditor General

The Stationery Office