

TOWARDS THE 2012 GAMES

An Information Age Partnership Paper

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FOREWORD

1.	INTRODUCTION.....	3
2.	AN INFORMATION AGE VISION FOR THE 2012 GAMES	6
2.1	General	6
2.2	At the Games	7
2.3	Remote And Virtual Participation	10
2.4	Communities	15
2.5	Public Safety	19
3.	COMMON TECHNOLOGICAL FOUNDATIONS	27
3.1	Digital Platform.....	27
3.2	Information Assurance	28
3.3	Seamlessness.....	29
3.4	Location.....	30
3.5	Content.....	31
3.6	Transport And Environment	31
3.7	Security	32
4.	THE VITAL DECISIONS	34
4.1	Digital Platform.....	34
4.2	Information Assurance	34
4.3	Seamlessness.....	35
4.4	Location.....	35
4.5	Content.....	35
4.6	Transport And Environment	36
4.7	Security	36

FOREWORD

The Information Age Partnership was invited by the former Minister for Industry and the Regions and then Chair of the Partnership, the Rt. Hon. Alun Michael MP, to provide a technological vision for the future, using the 2012 Games as a catalyst to spur on innovation and enable UK businesses to contribute to the economic legacy that we all hope the Games will leave.

This paper, which is the collaboration of over 60 companies, is one vision of the future technologies that could enhance the Games experience for all concerned, and as such is intended to generate debate and fire the imagination of all interested parties. For a variety of reasons, it will not be possible to implement all of the ideas in this vision, but UK businesses are in a prime position to innovate and help build a sustainable economic legacy for the UK. The issues raised in the paper need to be addressed if the opportunities to showcase their innovative technological solutions are to be realised, either for the Games, or subsequently.

The paper is a significant think-piece from across a wide number of sectors. The Partnership was asked to apply some creative thinking to the opportunity of future technologies, using the Games to crystallise their thoughts, whilst recognising that some ideas would not be possible by 2012, but may become reality at some point in the future. It is for this reason that some of the thoughts in the paper may be seen as ambitious or unrealistic - we asked the Partnership not to be constrained in their vision.

Consequently this paper and the possibilities it presents are not endorsed by the Government, the London Organising Committee for the Olympic Games (LOCOG) or the Olympic Delivery Authority (ODA). However, the paper highlights a number of important issues for consideration, and paints a bright picture of the way future technologies can enhance major future events like the 2012 Games.

1. INTRODUCTION

The Information Age Partnership (IAP) is a forum which supports high-level dialogue and debate between the chief executives of the UK's leading IT, electronics, communications and content (ITEC) companies, ministers and senior government officials. Its purpose is to stimulate and support initiatives to help the UK to take maximum global advantage of the technological, economic and political developments which characterise the Information Age.

The IAP regards the 2012 Games as a unique opportunity to:

- Rally UK companies and universities around a mutually-owned vision of how Information Age technologies can be used to national advantage.
- Spur-on innovation, collaboration and investment throughout the value chain.
- Showcase UK technological prowess generally.

Therefore the IAP wishes to contribute to the thinking, at a formative stage, of industry and the many other stakeholders in the 2012 Games, including particularly government and the London Organising Committee for the Olympic Games (LOCOG). To that end, in June 2006, the IAP initiated a process of gathering the thoughts of the IAP's members and, through them, many other companies. Some 60 companies participated in a programme of workgroups and plenary meetings in the six months between June and December 2006. The IAP is grateful to them and to LOCOG for the close interest that it has taken in this programme of work and for the guidance that it has provided.

This IAP Paper summarises the outcomes from the work programme in three parts.

The first part sets out an Information Age vision for the 2012 Games from four complementary perspectives:

- At the Games.
- Remote and virtual participation.
- Communities.
- Public safety.

The second part considers the technological foundations common to realising the Information Age vision.

The third part identifies the decisions required to enable those technological foundations to be put in place in time to achieve an appropriate balance between risk and innovation.

At every stage of the IAP's work programme, and in every dimension of its thinking, it has been made acutely conscious of the need for the "vital decisions" listed in section 4 of this paper to be made during 2007. It is in the context of this urgency that the following sections of this paper should be read.

2. AN INFORMATION AGE VISION FOR THE 2012 GAMES

2.1 General

This vision specifically supports the objective that the 2012 Games will be the first all-digital Games. Every aspect of the Games will be enhanced by digital technologies and will showcase the UK's capability as the foremost innovator in the Information Age. More than that, the achievement of winning the 2012 Games provides a remarkable opportunity for London and the UK to project an inspirational and enduring image to the global marketplace (four billion television viewers are expected globally). The potential benefits include:

- Enhancing the image of the Olympic Games and global sport in general.
- Stimulating a sustainable improvement in UK sport.
- Enhancing the image of London, the regions and the UK as a whole.
- Providing a global showcase of UK industry and services.
- Improving UK skills and image in the planning, design, build, delivery, operation and investment in very large projects.
- Providing benefits to the economy (including business and tourism), social, health, environment, education and volunteering.
- Creating a world class infrastructure for future exploitation.
- Providing sustainable benefits in culture, inclusion (UK and International) and local communities.

The application of advanced Information & Communications Technologies is crucial to delivering these benefits.

The vision is based on technological foundations that are expected to be in place by 2012, although the technologies may be at different levels of maturity. Two technological maturity levels have been considered:

- Highly mature technologies suitable for use in systems critical to the running of the Games.
- Less mature technologies suitable for enhanced communication, information and entertainment applications which could:
 - Be deployed by the Games organisers on a “best can do without damage” basis, or

- Be established within the open source, independent software developer community and be capable of exploiting published data feeds from the official Games information systems.

The vision comprises four sections for four groups of people:

- Those physically participating at the Games; athletes, organisers, spectators, news media staff and sponsors.
- Those participating remotely and virtually; principally remote spectators from the rest of the UK and around the globe but also those physically attending who want an extended entertainment experience.
- The communities in and around the Games venues and arenas; principally London and the other major venues, but including the communities with long-term direct involvement with the Olympic movement.
- Those responsible for all aspects of safety and security at the Games venues; at the major accommodation centres for the Games; and in the transport network that will feed into the venues.

2.2 At the Games

2.2.1 During the Games

All attendees at all venues should enjoy a rich, multi-media, multi-channel, experience. There will be many hundreds of information feeds available to anyone within the stadiums. These will be audio, video and data (XML and HTML).

Ubiquitous use of wireless technologies will be the norm. Thus any information feed will be accessible through portal technology to any device, from large public plasma displays, through kiosk based terminals, to handheld portable devices. Technologies will have converged to the point that any device will, in principle, be compatible with and able to handle any type of information feed (form-factor issues not withstanding). Access portals will have evolved to provide sophisticated capabilities including language translation, storage for short term information, pause and rewind, and personal storage for personal recordings.

The basic aspects of the experience can be categorised as the ability to:

- Watch or monitor any event from any physical location.
- Read text and listen to commentary in any common language.

- Replay and review, any recent activity.
- Subscribe to medium to long term archive material.
- Enjoy simulations, visualisations and technical summaries of major achievements, with scientific parameters and models of performance that help explain winning and losing.
- Review the whole schedule, to book tickets, to order merchandise and so on from any device.
- Share experiences through URL links and instant collaboration with family and friends.
- Share own captured content (video and still photographs) instantly with others; either directly, device to device, or through portal technology.

Further, all other potential needs of attendees will be delivered through a similar multimedia, multi-channel experience with special emphasis being placed on the needs of the disabled and vulnerable:

- Local accommodation, transport, restaurants, merchandise will all be browsable and bookable from any device.
- Security, safety, congestion, alternative routes and personal alerts will be pushed to location-aware devices.

2.2.2 For Athletes, Contestants, Trainers and Team Officials

Special services are envisaged for those competing, based on the provision of full-function PDA/mobile phones to all competitors. This will deliver all the capabilities as outlined above, and in addition will:

- Show a personal schedule of training, events, meetings, medicals, drug tests, interviews, meals, accommodation entertainment and trips out.
- Allow real-time collaboration with other athletes, trainers, staff, country entourage, press (where wanted) and VIPs.

Micro-tags, vital sign monitors, RFID tags and the like will be commonplace for trainers and medical staff to monitor the athletes both on and off the course. During events, data feeds from these devices could, with permission, be made available to commentators and analysts – and to others creating a virtual experience as described in the next major section below.

2.2.3 For Judges, Referees and On-Field Officials

Clearly all the above capabilities will be included, but in addition an even greater range of tools to assist their responsibilities is envisaged, including sophisticated animation, simulation and 3D modelling capabilities.

Specialised trackside and ringside sensors, displays and rendering devices – well beyond the scope of the devices available to the other classes of user – will ease the tasks for the Games officials

2.2.4 News Media and Press

The role of commentators is to provide near real-time added value to the spectator. Television allows all of us to see what is going on at the time; commentators add to our enjoyment and understanding. They can do that satisfactorily only if provided with information that the spectator does not have. Therefore it is expected that commentators, reporters and newscasters will have access to rich data feeds of analytical data, in real time, delivered to portable devices which can prompt, audibly and visually, with new information.

2.2.5 Other Considerations

Visitors to the 2012 Games will come from every corner of the globe, every culture, every language and every level of technological maturity. The richness of experience must be the same for all. So there will be a need for short-term rentable portable devices, perhaps with subsidies for people with disabilities and those with special needs. Indeed the technologies are likely to have matured to the point that some such devices may essentially be disposable – so that the price will be for the service rather than the technology.

This implies a need for the structured provision of fee-based information services for all – a significant change from the conventional view of fee-based attendance.

Given the anticipated blend of in-person and remote experience, together with the ubiquitous availability of portable devices, it is likely that ticketing will be delivered through those same devices. The mobile phone, equipped with its secure chip, will unlock any service or attendance. Contactless sensors will eliminate the need for the handling of paper tickets. Smartcards will enable attendance by those not engaged with the multi-media experience.

Nominated charities and the underprivileged will benefit from donations; the resale of unusable and part used tickets; bidding for memorabilia; and through the electronic services provided.

2.2.6 Before The Games

The capability and capacity of “the multi-media experience” will grow between now and the start of the Games in 2012. Today’s internet, the Web and the early moves to Web 2.0 herald the following possibilities:

- A showcase for LOCOG, stimulating interest in the:
 - Venues, the construction projects and the regional re-generation initiatives.
 - Athletes as they prepare for qualification. This could include sponsorship.
 - Technologies that will be available.
- Discussions, blogs, wikis and the Web 2.0-based constructs for involving everyone and stimulating interest in, and anticipation of the digital 2012 Games.
- Promotion of tourism, selling “total” holiday packages, and promotion of major UK attractions for combined and extended trips.
- Choose and book.
- Advance retailing of merchandise.
- Recruitment of staff needed on-site during the Games.
- Archive footage of previous Games highlights.

The Internet will play a major role in helping to promote athletes; seek sponsorships; form associations with schools and athletic clubs; and involve the global public in the ethos of the 2012 Games. It will provide opportunities too for athletes and coaches to study the performance of rival competitors in the run-up to the Games through the studying of archive material and re-purposed broadcasting.

Judges and other officials will make use of the various technologies discussed above before the 2012 Games for training purposes.

2.3 Remote And Virtual Participation

2.3.1 The Technological Context

The London Games in 2012 is hailed as the first all-digital games. The remote audience, comprising many billions of people around the globe, will enjoy a new level of experience and involvement notwithstanding that they are not able to be present in person. The term “remote and virtual participation” is used to encompass the many ways in which 2012 technologies will be harnessed to deliver those heightened experiences.

Some of the enabling technologies are mature, or nearly so, and their application to the 2012 Games will be largely a matter of scale. Other

technologies, such as Virtual Worlds, are emerging today but are likely to mature at such a rate that they will play a significant role in enabling virtual participation in the 2012 Games.

The technological context in which remote and virtual participation in the 2012 Games will be set is expected to be:

- **Connectivity:** The whole of the UK and the economically developed nations will be connected with bi-directional high speed wireless and wired networks. WiMax will be ubiquitous in major cities.
- **Infrastructure:** Virtually unlimited shared and local digital storage will be available to all. The core infrastructure will connect processing nodes at speeds in excess of 1Gbit/s carrying bi-directional data, audio and video.
- **Devices:** Mobile phones, televisions and computers (PDA, laptop, deskside) will all be capable of performing computing, communicating and entertainment oriented tasks. File formats will be exchangeable between these devices.
- **Identities:** Consumers will use assured digital representation of their identities to access all services. Such identity management will ensure security both for the content and the consumer.
- **Software:** Will be based on open standards though proprietary software will coexist. Service oriented architectures will be the norm with service interfaces invoked by natural language constructs.
- **Internet:** Will be based on IPv6 addressing; will have in-built reliability; and will have a formal layered set of protocols for access rights and performance management. The current move to so-called Web 2.0 services will be mature; the metaverse paradigm will be the norm and collaborative computing will embrace a significant proportion of the population. (These ideas are explored in more detail in paragraph 2.3.4).
- **Cars:** Like homes, cars will be equipped with digital devices providing entertainment, communications, a permanent connection to the home, and GPS-based tracking and logging.
- **Entertainment:** Will have evolved to a mix of storytelling, game-playing and interactive community building. A movie may have many endings, with viewers having to engage solve problems or puzzles for the storyline to continue. Many people across many locations may become part of the story and will experience the entertainment together at first hand.

The following paragraphs consider “remote participation” and “virtual participation” separately.

2.3.2 Remote Participation

Before the 2012 Games (from today to a few days before the Games) technology can be used to great effect to create a surge of excitement and participation. Scenarios that can be considered include:

- Following venues as they are built.
- Following athletes from all over the world as they prepare and train.
- Participating in community collaboration around each key sport, contributing in a variety of ways to the promotion of the sport and those taking part. The development of sophisticated content management and internet commerce capabilities can be envisaged.
- Adopting an athlete. A local community, or a town or village could “adopt an athlete”, contributing to his or her training, providing support and contributing financially. This could be a global programme to stimulate interest in athletes and sports that are under-represented in a particular country.
- Enabling the twinning of schools; between nations with shared interest in a sport or athlete; between UK schools and Chinese schools, bridging 2008 to 2012. This could further promote learning, cultural exchanges and create important social and learning experiences.
- Promoting the Olympic dream and the opportunity for today’s school students to become the Olympic stars of 2012.
- Providing online video diaries, blogs and wikis of the athletes to potentially generate income for the athletes to fund their training.
- Following the torch. As the torch goes around the world, it will be possible to create an ongoing video with GPS tracking that allows people to see at any time where the torch is and what is around that area, and link this to events around the world.

During the 2012 Games, the focus will be on the games themselves and on relaying the games experience in innovative and imaginative ways around the globe to maintain the focus on the UK as the leading exponent of digital technologies:

- The role of user-generated content will be important. While always respecting content rights, users will be able to contribute their own videos and commentaries from events and share these through collaborative websites. There should be conscious efforts to consider enabling commercial opportunities for those with appropriate skills and creativity.
- Data feeds of sport statistics, athletes’ performances, movement tracking and sensing will contribute enormously to the remote

experience. Many millions of people around the globe will be able to access and exploit these data feeds in real-time and historically.

- Constraints on the number of television channels will be significantly reduced. The BBC was able to provide only 5 streams for the Athens Games. For the 2012 Games, no event will be left un-broadcast. For the UK, HDTV will be the norm.
- The possibilities for personalisation will enable all those with special needs to participate in a far richer way. This will also broaden the available audience for the Paralympics.

After the 2012 Games, there will be a great opportunity to create a “Digital Legacy” for London, the UK and the global community. Ongoing, meaningful activity will help to maintain an historical awareness of the 2012 Games. For example:

- Those who have adopted an athlete can be rewarded by community visits by the athlete.
- Schools can continue twinning programs with schools from the next Olympic city.
- Selected video footage from the Olympics can be put into public forums so that they can be used by UK plc for marketing the UK.
- Events such as “online Olympiads” can be set up in a phased manner after the 2012 Games so that some of the fervour can be retained within specific communities.

2.3.3 Remote Participation – The Mission-Critical Technologies

Broadcasting (via any device or network) is mission-critical for the 2012 Games. Today we accept that there must be a base level of broadcasting of key events on a global basis. By 2012, video streams will contain selectable camera angles and alternative multilingual commentaries, and will be available from instant replay edge servers all controllable by the consumer (the PVR will be outdated). Further there will be the ability to offer specialised viewing and commentary to people with sensory disabilities.

As broadcasting merges with digital data stream publishing (including RSS feeds of real-time data from athletes’ sensors, Hawkeye and the like) and the user experience is delivered through a meld of these technologies, the provision of such data streams will also be mission-critical. The range of data services will encompass all Olympic events with consumer-controlled views and reviews via any device. Entrepreneurs will repurpose this digital content for the world’s poorer nations to accommodate the lower level of technology maturity. These core digital data services must also be regarded as mission-critical.

Beyond this mission-critical need lies the ability of the consumer himself to create a personalised experience and add further value, perhaps for distribution to others. The rich provision of information feeds will enable a mature (by 2012) market for virtual games attendance and participation.

2.3.4 Virtual Participation

In the last 12 months, Virtual Worlds have become a compelling reality. For example, Second Life uses game technology to provide a virtual world, relying on the wiki paradigm to allow users to create their own content and “mashups” of information feeds and to superimpose these onto the virtual world they have helped to create. People “live” in this virtual world inside the skin of their chosen avatar and are aware of, and can communicate with, people (other avatars) nearby. Most importantly people can share their experiences with others close by. The “population” of second life has grown to 1.5 million in just three years.

Virtual Worlds already offer opportunities to participate in sporting events:

- People can attend a virtual Grand Slam tennis match in a virtual court; they can chat with each other and discuss the game. They can watch a live video feed; watch a near real time data feed of ball tracking data in the three-dimensional space; and view the game and the players from any angle.
- The opening game of the Major League baseball season was projected into a virtual stadium. Tickets to the virtual event were sold (Second Life has its own currency) and spectators could watch both a video feed on a screen and a virtual representation of the positions of the players on the pitch in 3D.

The relevance to the Olympics in 2012 is self-evident. There will be, in Second Life and within the other similar platforms, many instances of virtual 2012 Games. People will create virtual venues and avatars to represent the athletes and other participants. Users will, in the person of their own avatars, be able to attend the virtual Games of their choice. They will use data feeds; video, audio, results, scoreboards, player analysis, hawkeye, news etc. To create an alternative experience which they will share actively with others. The fact that the 2012 Games will be the first ever all-digital Games, means that the digital information resources will be exploited to the full and the virtual Games will, in reality, be unstoppable.

Virtual Participation offers a huge opportunity to the IOC and LOCOG. It could drive new revenue streams, new marketing opportunities and

new opportunities for brand exposure (for the Olympic organisers, for their sponsors, and for London and the UK).

In order to realise those opportunities, it is important that the IOC and LOCOG develop innovative ways of licensing and protecting information feeds so as both to create new revenue opportunities and to safeguard the quality of user-generated content associated with the “London All Digital Olympics” brand.

2.4 Communities

2.4.1 Defining Communities

The vision for communities extends the application of advanced Information and Communications Technology beyond the time period bound by the opening and closing ceremonies of the Olympics and Paralympics. Communities already exist, and will continue to exist post-Games. However, the Games themselves will act as a catalyst for these communities to evolve further and faster, and even for the creation of new communities.

The term 'community' is used to embrace everyone from those attending the Games, to those coming together pre-Games to build the infrastructure and venues, as well as those that live in and around the venues. Information & Communications Technology can, and will, have an impact upon these communities, affecting a broad spectrum of social and economic factors including health, transport, education, living, business, environment and culture.

The 2012 Games will be unique in two respects:

- The regeneration required in large areas of East London. These areas are characterised today by serious social deprivation, poor or non-existent housing, minimal public transport services, high crime rates, and drug abuse. The 2012 Games will enable the transformation of these areas and leave a substantial legacy.
- The technology legacy. The development of the technology-based infrastructure required to support the 2012 Games will leave a legacy to support business and the communities in radically new ways well into the future.

2.4.2 Digital Communities

The enabling and development of new digital communities will lead to unprecedented digital participation in the 2012 Games pre, during, and post-Olympics:

- A catalyst for the use of ICT within communities, demonstrating how ICT can enhance the Olympics' experience.
- A training and education programme that is comprehensive and community-based will be developed, covering all ages and abilities.
- ICT will be used to help bridge the digital divide and to enable those that are currently excluded to participate at low cost.
- An extensible digital infrastructure that extends throughout the communities and has positive impacts upon its daily lives, covering health, transportation, education and many other challenges will be developed.
- ICT will bridge the physical and cultural divide between nations and encourage partnership between schools, clubs etc. Around the globe, particularly those close to the other Games planned over the next two decades.

The inter-dependency between the 2012 Games and its communities is illustrated by the following three scenarios.

2.4.3 Scenario 1: Social Inclusion

This scenario is one of an elderly person, 65 years old, concerned about their personal security and carrying cash, wanting short-term employment to supplement a pension, not confident or literate in the use of computers and living just outside the regeneration area. The questions about the 2012 Games to which that person will need answers may include:

- Where and how can I find information about the Games?
- What is available to see at the Games, and when?
- How much will it cost?
- Transport – how will I get to the event?
- Money – how do I pay for the ticket?
- Facilities – what is provided at the Games (food/drink/toilets)?
- I have a heart condition – are there medical facilities on hand? Do I need to take anything with me in case of problems?
- Safety – how will I be protected from crime and fraud?
- Are there opportunities for part-time work? Where can I go to apply?

This person will need the opportunity, encouragement and means to use ICT to answer these questions. Therefore the Games will be a primary catalyst for e-inclusion, through:

- The provision of community access to ICT learning and computer equipment; coupled with:
- The creation of an environment to meet people, share experiences; and in so doing:
- The building of new community ties through the establishment of new e-enabled local services.

And after the Games:

- Building upon the initial exposure to ICT for those newly e-included.
- Providing e-enabled services (e.g. travel passes) based on Games technologies.
- Encouraging and facilitating the take-up of other private and public sector online services.
- Continuing to enhance and stimulate the communities' collaborative experiences.

2.4.4 Scenario 2: Business Start-Up In East London 2012 Games Regeneration Area

This scenario is one of an entrepreneur in their early 30's, running a start-up business (perhaps a restaurant serving a science park in the day and the local community in the evening, or an innovative ICT company), who lives locally in East London and sees the opportunities for regeneration that the Games will bring, including a growing and long-term customer base. He or she will have used training provided by the London Development Agency or Local Authority, is actively involved in a local business group or cluster and wants to be active in using the new ICT infrastructure to support business growth. This person will want to know what is available to support his/her new business and its growth:

- What premises are, or will be available?
- What support is there for new businesses to encourage them to move into the area?
- Where are the local trade associations or clusters? How can businesses interact, partner and exchange ideas?
- Safety and security – how are business premises protected? How are the business areas and zones made safe for customers?
- How can businesses build up a local, regional, national and international customer base?

- What happens when the Games are over? What steps are being taken to ensure a sustained positive legacy for business?

The regenerated area in East London will be used actively as a catalyst for:

- The creation of an excellent infrastructure – transport, public utilities and communications.
- The development of a London-wide University initiative to develop a science park in the re-generated area to rival, for example, Cambridge.
- The long-term growth of the community with people able to move into the Olympic village. The creation of a balanced mix of social housing and accommodation for the ‘up and coming’ community thereby creating customers for businesses.
- The active development of services with the local community in mind: local shops, restaurants, leisure services, libraries.
- The development of a prestigious local centre for the Arts – art, theatre, music, opera and digital media based entertainment coupled with the clear opportunity for community engagement and involvement with a range of arts projects.
- A focus on business training and entrepreneurship: local councils providing training (face-to-face and supported by e-learning) and support for grants to aid start-ups.
- An ICT infrastructure built-in as part of regeneration effort. Ensuring high-speed, low-cost communication links for all, including wireless everywhere, managed network security, and digital subscriber content on demand.
- An emphasis on uptake and community involvement in ICT to ensure broadly-based improvements in the skills of the local workforce.

2.4.5 Scenario 3: Regional Community – Weymouth

There will be many challenges for an established local community which has to accommodate a short-term massive influx of people and related activities. Public sector organisations (Local Authority, Primary Care Trust, Emergency Services etc.) will need to get together to discuss the impact of the Olympics; voluntary sector organisations will want to engage with the public sector; and the discussions will need to address broad ranging topics ranging from the opportunities for economic development, through the use of the Games within the education system, to concerns about the transport infrastructure and its ability to support a significant influx of people. The primary question will be: What effect will one million visitors for the sailing events have on the Weymouth community?

- How will accommodation be provided?
- How will visitors access information – locally and remotely?
- Can the transport infrastructure cope – does it have the capacity?
- How can much needed environmental issues be promoted and accelerated – e.g. park and ride, use of tagged bicycles, use of electric vehicles?
- How will Weymouth scale up (before the Games) and scale down (after the Games) its infrastructure capacity? Or will the scaled up infrastructure be sustainable for the long term?
- How can Weymouth ensure that any legacy is of the right scale for use after the Olympics (e.g. a new centre for active/water sport tourism)?
- How will health care cope with increased service demands?
- What special measures for public safety in a large coastal town need to be considered?

The Games will be used as a positive and dynamic catalyst for development, with activities which will include:

- A review of transport systems leading to significant re-development of the infrastructure between London and the South Coast.
- Ticketing systems that integrate with the London system for transport and event ticketing.
- A high-speed network link built into the new transport infrastructure, supporting everything from broadband connections to homes, businesses, and community centres. The network will be financed by a public/private partnership and support a range of services from CCTV, through public service broadcasting, to a new network for schools.
- The Local Authority being able to work more closely with the voluntary sector and engage it in helping to develop and deliver a community-based training programme for ICT, around and about the Games theme.
- Weymouth setting up a “host a visitor” campaign to encourage and promote tourism.
- Free park and ride services being made available on environmentally- friendly buses as a permanent legacy.

2.5 Public Safety

2.5.1 The Visionary Purpose

“To create, develop and deliver a technologically-enabled collaborative environment that ensures Public Safety and Security before, during and after the London Olympic & Paralympic Games in 2012, such that the audience is able to fully focus on enjoying the spectacle itself.”

Public Safety in respect of the 2012 Games extends far beyond the Olympic Park in Stratford. In the public perception, there will be no physical boundaries. International and domestic visitors to any of the Games venues will want to travel to the event, enjoy the competition and get home safely. The parties responsible for the delivery of public safety and at all points in their journey will need collaborative processes and underlying technologies to enable the sharing of information in real-time or near real-time. This will help maximize the likelihood of continuous positive safety outcomes, not only during the Games themselves but also in the build up to the Games. In many cases, this will also enable a legacy of improvement after the Games have ended.

Not all technology is innovative and risky. Technology evolutions beyond those already deployed, such as the continuing improvements in CCTV storage, access and analysis, are available today and will continue to mature and develop in the build-up to the Games. Disruptive technologies, providing as yet unforeseen uses and benefit, will undoubtedly emerge over the next few years as they have over the recent past, e.g. WiFi and GSM. We should not discount the rapid emergence of technologies that today have yet to reach the same scale, e.g. WiMAX.

If full advantage of these technologies is to be taken, action to agree standards, availability of spectrum, collaborative activity, etc. must be taken soon, and in most cases, by mid-2007.

2.5.2 Adoption and Legacy

The legacy of technology is two-fold. First, the Games should be a catalyst for the UK to develop and implement technology solutions that will continue to operate post-Games for the benefit of others, e.g. the local public community, security services and stadium operators.

Second, the successful demonstration of these technologies in contributing to a safe and secure Games environment undoubtedly will help to cement the technological legacy for future Games and more generally, on a global scale, to the industrial advantage of UK plc.

2.5.3 Before The Games (Construction, Planning and Test Events)

The most immediate strategic challenge in developing a successful post-Games ‘legacy’ environment is the transformation of the public’s

perception of the Olympic Park from its present reputation of being an unsafe, high-crime environment to becoming an area considered 'safe' and a desirable place to live. This is arguably fundamental to achieving the required true economic rejuvenation throughout the primary Olympic locality, as has already been achieved in the London Docklands area.

CCTV has clear potential to help ensure public safety, but it is acknowledged that CCTV is of operational value only when the information is well organised. This represents a key technological and economic challenge for information technologists to address. While the progressive converging of CCTV and mainstream IT technologies has yielded major advances in the organisation of surveillance information, this information has yet to be integrated with other systems, particularly command and control and resource management, such that tangible advances in Public Safety and security levels become evident. The issue is not one of wholesale upgrade and replacement, but of the collaborative integration of existing CCTV infrastructure with standard IT infrastructure and processes.

Increasingly, organisations are insisting that their CCTV operations embrace the same 'Information-age' principles that have long been adopted by their IT operations. These include:

- Information must move to the person and not the person move to the information.
- Information must be centralized, backed-up and secured before being shared widely.
- Information must be rapidly available to people to support their decisions.
- Information processing tasks should be automated wherever feasible.

A new vision of CCTV deployment and operation is emerging rapidly, supported by the integration of technologies such as:

- Two-way, high bandwidth wireless IP-based public safety networks with mobile data, video feeds and local-area or wide-area public address capabilities, connected to advanced technology-rich control rooms that securely receive, record and transmit CCTV surveillance feeds and incident information direct to the public safety (particularly those designated as first responder) services in the field, through mobile wireless devices.
- Video surveillance alerts generated automatically through the widespread deployment of video analytical technologies that enable

the identification of situational anomalies and early prediction of potentially threatening behaviours.

- Comprehensive scene capture through the deployment of fixed 360° vision mega-pixel (and high-definition) cameras automatically monitored and rendered through analytical technologies enabling major vision enlargement and zoom capabilities.
- Cohesive 'open' integration with all other public safety systems.
- Identity management and related technologies:
 - ID badges, biometrics, subcutaneous chip implants.
 - Access controls, perimeter protection, particulate sensing.
 - Crisis response workflow and monitoring systems.

These CCTV capabilities are available today off-the-shelf, and should be considered for immediate deployment widely, in a high-profile manner, in order to deter, detect and enhance the response to all criminal activities and to engender a sense that these localities are becoming much safer and increasingly desirable places to live, and provide a lasting legacy.

A further extension of high-definition CCTV solutions is the potential offered by their combination with maturing biometrics technologies to deliver a greater throughput of people through access routes during both the construction phase and Games themselves. This capability too will contribute to the easy, accountable access to goods and services and contribute to the improvement of trust in the public safety processes.

Additionally in the areas of incident response and recovery management biometrics will provide significant benefits in the area of crime detection and the health response.

There are a range of non-intrusive biometric technologies available in addition to fingerprinting, and facial recognition (FR) and iris recognition (IR) are seen as particularly promising. By 2010, it is anticipated that 3D FR technology will be well advanced and that advances in database technology will make "one-to-many" (OTM) searching as practical as is "one-to-one" (OTO) currently. Two dimensional (2D) FR already has over 8 years of acceptance in the Government facing construction industry in the OTO configuration.

Hand geometry, vein pattern, gait, voice and DNA are all forms of biometric technologies that should be monitored closely over the next 4 years.

2.5.4 During The Games - Reducing The Temptation To Offend

The task of organising the thousands of officials, volunteer stewards, cleaners, maintenance staff, etc. in addition to the public safety professionals will be immense. Many staff will need to be issued with equipment and clothing to enable them to carry out the functions they have been assigned and make them instantly recognisable as Games officials. Many staff will be mobile, in venues for much of the day, returning to staff areas infrequently. In addition to the clothing, staff will be issued with radiocommunication devices, to perform their roles. Traditionally, this has consisted of discrete items of equipment that are not integrated and require different modes of access, authentication and powering. Hence portability is also increasingly an issue.

Technologies now in prospect offer the possibility in the years between now and 2012 of unprecedented levels of integration thought once to be in the realm of science fiction.

Indeed, for illustrative purposes, it is possible to imagine the issuing in 2012 of only one item of equipment - an 'Intelligent' jacket. The jacket is lightweight and made from a heat sensitive fabric that can help regulate the wearer's body temperature. The fabric is immensely strong and easily able to withstand a puncture. Incorporated into the fabric of the jacket is a suite of modern communications equipment powered by tiny solar cells woven into the fabric. The fabric itself is able to change colour, based on electrical input from the communications equipment, allowing it to be assigned for different roles. The communications package incorporated into the jacket will consist of a flexible, touch-sensitive control and display panel built into the arm. Telephony, two-way voice, data and video messaging will be standard features in addition to a personal location service, an information query facility and translation service via the wireless communicator. A biometric sensor incorporated into the jacket will be used to validate the identity of the wearer and allow access to the required services.

The challenge is to decide now the degree of integration required in the public safety technologies for the 2012 Games, and the manner in which that integration will be realised. To leave that decision for another year will be to rule out the opportunity to take a quantum step forward, not only in the tools available to public safety officials, but also in building the UK's international prowess in public safety solutions.

2.5.5 During The Games - Tracking Movements

Mass movements of people can be tracked in and out of Games venues and related non-Games venues by various technological means. Combined with analytical processes, imaging and modelling technologies, abnormal events or behaviours can be monitored in real-time. Coupling GPS or Galileo to near-field communications at security

entrances will add accuracy for visitor-location and aid the tracking of selected people.

Galileo - Europe's satellite positioning and navigation system – could offer important public safety advantages for the 2012 Games if it is fully operational by 2010. Galileo will be interoperable with existing GPS receivers but will provide a stronger, more pervasive and more accurate signal than GPS. The signals will enable a wide range of tracking, surveillance, location, messaging and alert services. Some will be public services, including safety of life services, and some commercial. The Galileo signal will penetrate buildings more effectively and be affected less by adverse weather conditions.

The public safety and security capabilities enabled by Galileo will include:

- Identifying precisely large scale passenger/transport movements.
- Tracking targets and assets e.g. specialist vehicles, VIPs requiring protection.

It will be capable also of providing real-time information to UK residents and visitors such as:

- Location services giving ticket-holders practical information about transport, stadium facilities, nearby commercial services, etc.
- Improving the TV broadcasting of distance events e.g. sailing, rowing, cycling, marathon etc.

Collectively, with other concepts such as perhaps giving all Games ticket holders a “disposable” PDA, exploiting Galileo will provide an innovative, creative and practically useful dimension to the Olympic experience for authorities, officials and contractors concerned with public safety and security, as well as athletes, volunteers and visitors to the Games.

2.5.6 During The Games - Assisting Safe Travel

The use of media screens in various sizes and formats has emerged over the last two years as a method of conveying messages to large audiences at various types of events.

Such screens will provide national information at ports of entry for visitors and at key sites en-route to 2012 Games venues such as motorway service stations, taxi ranks, train stations, coach stations, underground stations etc. The closer an individual gets to the 2012 sites, the more specific the information will become to the venue in question. The screens will also have the ability to detect the “home

nation” of a roaming phone, so that the content can be delivered in the top three languages of the people in the vicinity of the screens.

The use of “split” screen technology and broadcasting should also be considered, so that multiple feeds can be delivered and managed accordingly for national, regional and sector information related to public safety and security.

At the Games venues themselves, the screens will have the ability to provide information on matters such as transport delays, “lost & found” children, crowd flow management, major incident management and first aid locations. Screens will be mobile and part of mobile robot-like kiosk devices. Public interaction will be improved through automatic language recognition, leading to facilitating personal assistance in that language or in some cases automated language responses. Advances in language translation may be particularly useful if a shortage of speakers of foreign languages is forecast.

Through self-activation/registration of RFID or other location technology, the user of a mobile phone will be able to advise the screens that a disabled person is in the vicinity and to request specific information to be provided that is relevant to the zone in which that person is. For the blind this could also include the screens broadcasting information by sound, or on to a hearing aid for the hard of hearing.

Critical to the provision of these safety and security services is the integration of key information sources, and the ability to distribute multiple information sources, (to do with transport, the Games themselves, etc.) through multiple application types. This will facilitate, for example, the displaying of Games schedule information on major rail station information screens, and public transport information within the Olympic Park.

2.5.7 An Information Age Legacy

There is, of course, a fine balance to strike between utilizing innovative Information Age technologies for the 2012 Games and ensuring that the technology is mature enough to be relied upon to deliver for a public safety or security situation. In striking that balance there is a clear difference between security and public safety applications.

Utilising innovative media (whether screens, mobile kiosks, intelligent clothing, disposable phone or pocket displays) will assist event organizers in improving public safety through the easy collation and dissemination of information – facilitated by the continued integration of information sources. The legacy here is firmly in the integration of information for purposes beyond the Games.

This integration also underpins the set of technologies that undoubtedly have a measurable benefit to communities, the security organizations and the public. Improvements in CCTV analysis and capture, utilization of the Galileo capabilities, biometric access technologies and managed situational awareness will assist in securing the Olympic environment, and will pay dividends for many years beyond.

3. COMMON TECHNOLOGICAL FOUNDATIONS

3.1 Digital Platform

The first-ever “digital” Games must have at its foundation a digital platform on which all those who aim to deliver added-value propositions in all four domains of experience (at the Games; virtual participation; communities; public safety) can build.

Very many of those who will build on the digital platform will be enterprises, both private and public. That is to say, they will judge the likely market for their prospective value-added offering; risk their resources to bring the offering to the 2012 market; and look forward to a return. In constructing their business models, they will have regard not only to the richness of the digital platform likely to be available to them, but also to the assurances that can be given to them about the availability of the platform. In the limit, enterprises are likely to weigh certainty more heavily into their thinking than richness.

Therefore it is essential that prospective participants in the 2012 value chain are told at the outset the assumptions that can safely be made about the standards, resources and built ICT infrastructure which will be made available as a digital platform.

Dwelling on when those planning assumptions need to be communicated, technology enterprises will require a minimum cycle time of four years from committing resources to launching the product or service. Working back from an in-service date of mid-2011 (one year before the 2012 Games to allow for proper piloting and scaling-up) implies that planning assumptions will need to be confirmed by mid-2008.

Enterprises’ business modelling will have to have been completed by then, so it is necessary to signal intent about the planning assumptions by the end of 2007 at the latest.

The confidence that enterprises place on the published planning assumptions will be a product in part of the visibility that they have of the strategies for the 2012 Games which lie at the root of the planning assumptions. It is suggested, from an Information Age enterprise perspective, that a hierarchy of strategies is appropriate:

- Top-most level – Participative Strategy
- Then – Information and Communications Strategy
- And below that – Transport Strategy, Payment Strategy, etc.

Turning to the richness of the digital platform, the attributes essential to foster enterprise are considered to be:

- Ubiquitous broadband
- Pervasive IP-based communications
- A hierarchy of 2012 Games-related information, including a “base load” of information available to all participants in the value chain
- A formal enterprise architecture
- Open, forward-looking standards and architectures, to enable the Information Age legacy

Immediate issues very much on the minds of the IAP members which, in the opinion of the IAP, must be addressed by the middle of 2007 at the latest are:

- Which elements of the digital platform are categorised by LOCOG and/or government as “mission-critical”, because enterprises will feel able to attach greater confidence to those elements being available by 2011.
- The date of the changeover to digital television in London, currently planned for 2012. The IAP suggests that the date should be advanced by two years, to 2010.
- Uncertainty about when terrestrial High Definition Television (HDTV) will be available. It is important to know, in 2007, whether and where it will be available in 2012.
- Uncertainty about which standards for mobile television will be in use in the UK in 2011 (the latest realistic date for piloting mobile TV services for the 2012 Games).
- Uncertainty about which standards for digital closed-circuit television (CCTV) will be in use in 2011.

3.2 Information Assurance

In a fully accessible, IP-pervasive Games, it is essential that stakeholders are assured of the confidentiality, integrity and availability of the information they are generating, sharing and using. The IAP recognises that a great deal of work is being done on the necessary standards of information assurance, and is confident that they can be implemented in time for the 2012 Games. The risk, from the IAP’s limited field of view, is that it is difficult at present for IAP members to identify a “champion” within government who is accountable for the timely implementation of a national, cross-cutting information assurance strategy.

In the construction of such a strategy, and with the needs of the enterprise stakeholders of the 2012 Games in mind, the IAP would highlight the importance of information assurance standards relating to smartcards, since they hold the promise of integrating so very many of the Games-related experiences which people will value. To realise this promise, it is necessary for the stakeholders in smartcard technology to:

- Commit to a process of reviewing and, where necessary, refining information assurance standards for smartcards for Games-related use by mid-2007.
- Put those standards in place by the end of 2007.
- Communicate the standards widely by mid-2008.

3.3 Seamlessness

“Seamlessness” is shorthand for the basket of technologies which, in combination, enable communication, information and entertainment to be available anywhere, anytime via any device or network.

The extent to which the reality of the 2012 Games lives up to the promise of the “first digital Olympics” will depend on the degree of seamlessness on offer to athletes, organisers, spectators, etc.

Seamlessness may be regarded as having six technological strands:

- Content handling
- Intelligent interaction
- Sensing and control
- Real-time communications
- Heterogeneous networks
- Session continuity

Work on these technological strands is proceeding apace in companies, universities and standards-setting bodies around the world, and is fuelling innovation in a multitude of diverse directions. Delivering seamless experiences specific to the 2012 Games will require focus, so as to enable enterprises to collaborate to create high-value, Games-related market offerings.

To achieve the necessary focus on the elements of seamlessness considered essential to deliver a rich 2012 Games experience, an advisory body should be established, perhaps under the auspices of LOCOG’s Technology Advisory Board, to:

- Suggest the minimum set of Games-related seamless experiences which should be available to athletes, organisers, spectators, etc.
- Set out how the technology investments required to deliver those experiences will create a legacy platform for innovative commerce, education delivery and public services, especially in the East London area.
- Identify the interoperability and other standards regarded as critical; suggest the deadlines for their publication; and foster open-ness in those standards.

Mobility will be key to delivering the degrees of seamlessness required for the 2012 Games. Mobility, in turn, depends on spectrum. It is likely that the availability of suitable spectrum will be a constraining experience on the richness of the experiences that can be offered.

In gauging the spectrum required, it is important not simply to extrapolate from previous Games. The 2012 Games – characterised by digital content, IP connectivity and seamlessness – will create an unprecedented level of demand for spectrum. It is essential that the work underway to gauge the likely demand and propose the means by which it may be satisfied progresses rapidly and in close engagement with industry.

3.4 Location

Sensors, cameras, RFID-tagged assets and SMART media-enabled devices linked to a central information management points will be important for the management of individual and mass movements of people and things, both within the Games venues and more widely.

As regards the digital mapping of the many Games venues, it is important that those who will be developing location-based services can be confident at an early stage about the scope and timeline of the digital mapping which will be carried out.

The Global Positioning System (GPS) is regarded as adequate to the task, but Galileo (Europe's satellite positioning and navigation system) is expected to offer a signal which will be stronger, more reliable, more pervasive and more accurate than GPS. It may be preferred by enterprises intending to develop Games-related value propositions.

Therefore it is important to signal:

- The degree of confidence that industry should have that Galileo will be fully operational by the 2012 Games technology lock-down date of 2010.

- Whether GPS or Galileo will be used as the backbone technology for any public sector or LOCOG-organised location-based services.

3.5 Content

Robust conditional access protocols will be required to enable the delivery of a tiered range of content, ranging from a basic service to the “complete” service package.

Digital Rights Management (DRM) is required to allow access to permitted users only, on the correct licensed terms, to the variety of data and information available.

Data should be conjoined where value is added for a legitimate purpose, and conversely, the aggregation of data which could undermine civil liberty, personal privacy or otherwise infringe data protection rules should be blocked. Differing levels of aggregation of data may be offered to different users dependent upon these considerations. For example, medical data about athletes might be supplied to a paramedic support function in detail, yet might be aggregated, summarised or blocked entirely to a broadcaster covering the event.

Mass-scale bandwidth able to operate in an RF-dense environment will be required to cater for the multi-channel, multi-lingual and accessible broadcast streams from which viewers will be able to choose. Viewers will expect this unprecedented level of choice to work smoothly and seamlessly.

HDTV should be the standard broadcast medium. High-quality mobile TV should also be commonly available by 2011 at the latest.

Virtual Worlds, or “metaverses” are emerging as a technological field in their own right and maturing rapidly. By 2012, it is likely that they will be not only technologically mature, but also commercially mature. It is important that the IOC and LOCOG take positive, enabling steps now to ensure that the 2012 Games can share in the opportunities afforded by Virtual Worlds.

3.6 Transport And Environment

One of modern societies’ most complex problems is enabling the free movement of people and things around the world’s major conurbations. London and a number of other 100 or so 2012 Games venues pose particular difficulties as historically-sophisticated urban settings now struggle to cope with modern travellers’ needs. Furthermore, there are entwined relationships between maintaining security, relieving traffic congestion and environmental sustainability.

Technology strategies are required to facilitate:

- Road-user charging.
- Congestion analysis and management systems. By using existing “street furniture” such as traffic lights, valuable data could be collected about predictive traffic patterns and bottlenecks. Decision-making could be enhanced by using existing infrastructure more innovatively.
- Navigation assistance and journey-management solutions.
- Sensor-management systems which monitor pollution levels and facilitate processes to maintain emission control standards (such as the MESSAGE pilot project run by O2).
- Connected roads, including new road building.
- The encouragement of multi-modal journeys, by multi-modal ticketing, etc.

A single SMART travel “card” (it need not be manifest as a card) could enable passengers to travel on any method of public transport, and cope with multi-lingual or the specific needs of those with disabilities. It is regarded as technologically straightforward once standards are agreed between the major stakeholders.

The single SMART travel “card” could double-up as an electronic “Games Purse” which could enable consumers to purchase goods and services in retail outlets, in addition to buying travel and tickets for the Olympics events, without delays or queues.

Multi-lingual customer service should be the norm in London and the other 100 or so venues in 2012. Plans should be put in place to ensure that public transport and service points cater fully for an agreed selection of languages (including at the very least all EU languages, Russian, Mandarin, Hindi and Arabic).

3.7 Security

A major challenge in any large event is controlling the traffic flow of people and goods safely through the area of the event and its immediate environs. Through technology such as RFID tags, people and assets can be tracked and information gathered and managed at a central point. This information greatly facilitates better security and public safety, and may also enable event organisers to present information to spectators which meets their personal needs. For example, information could be offered in the first language of the spectator or to cater for needs arising from specific disabilities. In an emergency, this could save invaluable time.

The cycle times associated with the implementation of tracking systems in wide and perhaps difficult geographies can be challenging. So it is important that the planning of such systems begins immediately and is carried out expeditiously.

The tracking of people should be based on biometrics which, by 2012, are likely to be sophisticated and thoroughly dependable. The biometric technologies likely to be available by the technology lock-down date of 2010 are substantially foreseeable. Therefore biometric standards which meet the needs of the 2012 Games security forces should be set by 2007.

Procurement cycle times should allow adequate time for the thorough testing of biometric applications in any mission-critical system.

Digital CCTV is likely to be an important security technology for the 2012 Games and, indeed, is likely to be linked strategically to biometrics. (Digital images from CCTV cameras are likely to be important feeds to, for example, facial biometrics matching systems). Therefore, in conjunction with setting biometrics standards, it is important also to set any security-specific standards for digital CCTV deployment around the Games, and to consider how and if such security systems must integrate with current and planned public systems.

4. THE VITAL DECISIONS

4.1 Digital Platform

- 4.1.1 Signal intent about the planning assumptions to be used by those intending to build on the digital platform by the end of 2007 at the latest.
- 4.1.2 Confirm the planning assumptions to be used those intending to build on the digital platform by mid-2008.
- 4.1.3 Underpin the planning assumptions with a hierarchy of strategies; e.g. Participative Strategy, then Information and Communications Strategy, and below that Transport Strategy, Payment Strategy, etc.
- 4.1.4 Communicate the list of elements of the digital platform categorised by LOCOG and/or government as “mission-critical”.
- 4.1.5 Advance the date of the changeover to digital television in London to 2010.
- 4.1.6 Determine whether and where High Definition Television (HDTV) will be available in 2012.
- 4.1.7 Determine which standards for mobile television will be in use in the UK in 2011.
- 4.1.8 Determine which standards for digital closed-circuit television (CCTV) will be in use in 2011.

4.2 Information Assurance

- 4.2.1 Identify a “champion” within government who is accountable for the timely implementation of a national, cross-cutting information assurance strategy.
- 4.2.2 The stakeholders in smartcard technology to:
 - (i) Commit to a process of reviewing and, where necessary, refining information assurance standards for smartcards for Games-related use by mid-2007.
 - (ii) Put those standards in place by the end of 2007.
 - (iii) Communicate widely the standards and their intended application to the payment strategy for the Games by mid-2008.

4.3 Seamlessness

4.3.1 Establish an advisory body, perhaps under the auspices of LOCOG's Technology Advisory Board, to:

- (i) Suggest the minimum set of Games-related seamless experiences which should be available to athletes, organisers, spectators, etc.
- (ii) Set out how the technology investments required to deliver those experiences will create a legacy platform for innovative commerce, education delivery and public services, especially in the East London area.
- (iii) Identify the interoperability and other standards regarded as critical; suggest the deadlines for their publication; and foster openness in those standards.

4.3.2 Progress rapidly the work underway to gauge the likely demand for spectrum and propose the means by which it may be satisfied, and closely engage industry with that work.

4.4 Location

4.4.1 Signal to industry by the end of 2007:

- (i) The degree of confidence that industry should have that Galileo will be fully operational by the 2012 Games technology lock-down date of 2010.
- (ii) Whether GPS or Galileo will be used as the backbone technology for any public sector or LOCOG-organised location-based services.

4.4.2 Determine the scope and timeline for the digital mapping of the Games venues, and communicate to industry by the end of 2007.

4.5 Content

4.5.1 Publish policy and guidelines on the Digital Rights Management of 2012 Games content.

4.5.2 Publish policy and guidelines on the permitted conjoining and restrictions on the aggregation of Games-related data.

4.5.3 Verify that there will be adequate broadcast spectrum for the 2012 Games, by 2007.

4.5.4 Accelerate the completion of the UK switch-over to digital TV by 2010.

- 4.5.5 Declare HDTV to be the broadcast standard of choice for the 2012 Games, by 2008.
- 4.5.6 Set mobile TV standards by 2008, choosing the standard(s) which will offer consumers the best quality over the long term.
- 4.5.7 Consider how participation in the 2012 Olympics may be enhanced by “virtual worlds” and devise safeguards to ensure that standards and the security of personal data are maintained.

4.6 Transport And Environment

- 4.6.1 Define a suite of holistic transport technology strategies to relieve traffic congestion, preserve the environment and maintain security.
- 4.6.2 Determine SMART media standards to ensure widespread interoperability between different devices and different networks within the transport infrastructure.
- 4.6.3 Consider defining the SMART media standards such that the devices could enable passengers to travel on any method of public transport, and cope with multi-lingual or the specific needs of those with disabilities.
- 4.3.4 Plan for multi-lingual customer service in all public service areas around the Olympic venues and major ports of entry into the UK. This plan should comprehend visitors’ interactions with both humans and with machines.

4.7 Security

- 4.7.1 Specify appropriate tracking systems to manage the flow of people and things within the 2012 Games venues and the surrounding urban environments. Tracking networks should cover the main traffic “corridors” from the major UK ports of entry to the Olympic event locations.
- 4.7.2 Set biometric standards which meet the needs of the 2012 Games security forces, by 2007.
- 4.7.3 Allow adequate time for the thorough testing of biometric applications in any mission-critical system.
- 4.7.4 Set any security-specific standards for digital CCTV deployment around the Games, and consider how and if such security systems must integrate with current and planned public systems.