Bluetooth

Bluetooth is a low power radio technology being developed with the objective of replacing the wires currently used to connect electronic devices such as personal computers, printers and a wide variety of handheld devices such as palm top computers and mobile phones.

The development of Bluetooth began in early 1998 and was led by a number of telecommunications and computer industry leaders. Motorola is a member of the Bluetooth Special Interest Group. The Bluetooth specification will be open and royalty-free, and available to anyone who wishes to use it in their products.

Bluetooth operates in the 2.4GHz ISM (Industrial, Scientific, Medical) band and devices equipped with Bluetooth should be capable of exchanging data at speeds up to 720kbit/s at ranges up to 10 metres. This is achieved using a transmission power of 1mW and the incorporation of frequency hopping to avoid interference. If the receiving device detects that the transmitting device is closer than 10 metres it will automatically modify its transmitting power to suit the range. The device should also shift to a low-power mode as soon as traffic volume becomes low or ceases altogether.

Bluetooth devices are capable of linking together to form piconets, each of which can have up to 256 units, with one master and seven slaves live while the rest are in standby modes. Piconets can overlap and slaves can be shared. A form of scatternet can be established with piconets overlapping allowing data to migrate across the networks.

Further information: www.bluetooth.com

CAMEL - Customised Applications for Mobile Networks Enhanced Logic

CAMEL is a GSM feature name for including IN (Intelligent Network) functions into a GSM system. CAMEL is used when roaming between networks, allowing the home network to monitor and control calls made by its subscribers. The feature allows numbers dialled to be modified during call set-up, and monitoring of call answer and cleardown. Possible applications include pre-paid roaming services, fraud control, special numbers (e.g. 123 for voicemail works everywhere) and closed user groups (office extension numbers work everywhere). CAMEL has been standardised in three phases, the first of which is starting to be deployed now.

Cellular Cassette

The cellular cassette is an accessory to a satellite mobile handset, enabling interoperation with the GSM network and essentially creating a dual mode handset. The handset can be set to either mode, or to automatic mode, when it will search for the GSM network first. If that is not available, it will automatically switch to the satellite network.

Dual Band

Dual band refers to the capability of GSM network infrastructure and handsets to operate across two frequency bands. The first dual band GSM network infrastructure and dual-band capable handsets were available from Motorola in 1997, with the first dual band 900/1800MHz European networks

implemented the same year.

Dual band technology enables a network operator with spectrum at both 900MHz and 1800MHz to support the seamless use of dual band handsets across both frequencies. By supporting seamless handovers between 900MHz and 1800MHz, dual band networks can provide major benefits in terms of capacity enhancement and revenue optimisation through the introduction of new services.

e-Commerce - Electronic Commerce

e-commerce is the broad definition of the new phenomenon of remote commercial transactions using telecommunications and the Internet. People are increasingly shopping for goods and services through the Internet, with suppliers developing specialist web sites that allow potential customers to 'browse' as if they were in a department store. The location of the supplier is irrelevant, they can be in the same country or many thousands of miles away. The take-up of e-commerce was inhibited by fears about the security of Internet transactions but advances in the encryption process have largely addressed these concerns and the e-commerce market is set to flourish. A key element in the success of e-commerce will be the forging of alliances and partnerships between the different operators, Internet Service Providers (ISP), content providers and vendors.

EDGE - Enhanced Data for GSM Evolution

EDGE, which is currently being standardised within the European Telecommunications Standards Institute (ETSI), represents the final evolution of data communications within the GSM standard. EDGE uses a new modulation scheme to enable data throughput speeds of up to 384kbit/s using existing GSM infrastructure.

As 384kbit/s is the data speed being offered in the first phase of third generation deployment, EDGE could offer an alternative route for GSM operators who will not have third generation licences.

EFR - Enhanced Full Rate

Enhanced Full Rate is one of the key features in developing new markets for differentiation of speech quality between existing GSM networks and new networks which have EFR infrastructure and mobiles. EFR not only enables the GSM operator to differentiate its product from existing networks it also allows it to better address wireline 'Minutes of Use' as it offers a comparable speech quality.

The Enhanced Full Rate speech codec has been defined specifically for speech quality purposes but a side effect of the improved coding algorithms is that it has higher tolerance to interference. The improved interference tolerance can in turn be sacrificed for higher system loading without subscribers noticing a degradation in overall speech quality.

GPRS - GSM Packet Radio Service

GPRS, which has been standardised by ETSI as part of the GSM Phase 2+ development, represents the first implementation of packet switching within GSM, which is essentially a circuit switched technology. Rather than sending a continuous stream of data over a permanent connection, packet switching only utilises the network when there is data to be sent. Using GPRS will enable users to send and receive data at speeds of up to 115kbit/s.

The implementation of GPRS will bring tremendous benefits to GSM network operators. It brings Internet Protocol (IP) capability to the GSM network for the first time and enables connection to a wide range of public and private data networks using industry standard data protocols such as TCP/IP and X.25. GPRS is extremely efficient in its use of scarce spectrum resources and enables GSM operators to introduce a wide range of value added services for market differentiation. GPRS is ideal for 'bursty' type data applications such as email or Internet access, and can also enable 'virtual permanent connection' to data sources, allowing information to arrive rather than being sought. This cannot be achieved using standard circuit-switched networks. By upgrading their networks to GPRS, existing GSM operators will have third generation capable networks, as 3G will use packet switching technology. An early move to GPRS can reduce the eventual investment needed to make the transition to third generation.

GPS - Global Positioning System.

GPS refers to satellite-based radio positioning systems that provide 24 hour three-dimensional position, velocity and time information to suitably equipped users anywhere on or near the surface of the Earth (and sometimes off the earth). The NAVSTAR system, operated by the U.S. Department of Defence, was the first GPS system widely available to civilian users. Applications include hand-held telematics, fleet tracking and vehicle management systems - wireless communication devices designed for automobiles providing drivers with personalised information, messaging, entertainment and location-specific travel and security services. GPS technology is used in a wide range of applications, including maritime, environmental, navigational, tracking and monitoring.

H.323

H.323 is a protocol for the transmission of real-time audio, video and data information over packet switching-based networks. Such networks include IP-based (including the Internet), Internet packet exchange-based local area networks, enterprise networks and metropolitan and wide area networks. H.323 can also be applied to multipoint-multimedia communications. The technology provides a vast array of services which means it can be used in consumer, business and entertainment applications. H.323 is an essential element in ensuring that the compatibility of the mobile multimedia applications and services will be introduced with the implementation of third generation wireless technologies. The H.323 standard was specified within the ITU-T organisation by Study Group 16. The original standard was realised in 1996 and further enhancements, up to Version 3, have been developed in the intervening years.

HSCSD - High Speed Circuit Switched Data

GSM is currently a circuit switched technology and HSCSD is the final evolution of circuit switched data within the GSM environment. HSCSD will enable the transmission of data over a GSM link at speeds of up to 57.6kbit/s.This is achieved by cocatenating, i.e. adding together, consecutive GSM timeslots, each of which is capable of supporting 14.4kbit/s. Up to four GSM timeslots are needed for the transmission of HSCSD.

HSCSD is part of the planned evolution of the GSM specification and is included in the GSM Phase 2 development. In using HSCSD a permanent connection is established between the called and calling parties for the exchange of data. As it is circuit switched, HSCSD is more suited to applications such

as videoconferencing and multimedia than 'bursty' type applications such as email, which is more suited to packet switched data – see GPRS.

HTML - Hypertext markup language

A script language used to describe the text content and format of a Web Page. It includes simple directives (called tags) which indicate the style of headings and content text, and select other features such as pictures or Java programs. The interpretation of the script language is highly dependent on the web browser used, the size of the screen and user preferences, which mean that the same HTML script rarely looks the same on any two computers.

http - Hypertext transfer protocol

http is the computer handshaking protocol used between a Web Browser and a Web Server to request and receive a web page. The protocol operates over IP.

iDEN®

iDEN® technology for Integrated Digital Enhanced Networks – Motorola's iDEN® integrated digital wireless solution is designed for mobile business users who need immediate access to information and people without having to carry several pieces of equipment. Four-in-one iDEN® technology allows users to take full advantage of advanced wireless technologies by combining the capabilities of a digital cellular phone, two-way radio, alphanumeric pager and data/fax modem in a single portable handset.

This integration strategy provides business professionals with flexible communications capabilities that allow users to access information in the most convenient and practical manner, depending on their objectives. Among the many benefits the iDEN® solution provides is the ability to instantly connect with one person or hundreds with the push of a button, thus eliminating time wasting and costly individual calls.

iDEN® systems are based on GSM architecture, however its efficient air interface utilises 25 kHz channels which can be non-contiguous. Today, iDEN® systems are operational in more than a dozen countries throughout North and South America, the Middle East, and Asia Pacific.

IMT-2000 - International Mobile Telecommunications-2000

IMT-2000 is the International Telecommunications Union (ITU) concept of a family of technological solutions that will enable the implementation of third generation wireless communications. The third generation of mobile technologies will operate in the 2GHz band and will deliver advanced, multimedia-type communications. IMT-2000 is the successor to the ITU's original concept of a single global third generation technology known as Future Public Land Mobile Telecommunications System (FPLMTS). This concept was abandoned when the ITU recognised the impossibility of creating a single global standard.

IP and VoIP - Internet Protocol and Voice over Internet Protocol

IP is a protocol used for the transmission of information, primarily between computers over the Internet. It works by dividing the information to be transmitted into a number of packets and then

attaches a header to each packet containing address information. The packet is then sent into the Internet where it is routed to its destination. Because each packet is treated as a separate entity, even through it might be part of a long message, IP is said to be a connectionless packet switched protocol. IP is well suited to the Internet as it is designed for networks of changing structure where packets might get lost or delayed.

Voice over IP takes standard voice signals and encodes them using IP. At present most voice signals are carried using circuit switched bearers where a channel is set up and maintained between the calling and called parties for the duration of a call. Using IP results in a very different arrangement where the voice is divided into packets and each packet is sent separately. The benefits of this are that the total bandwidth required can be reduced since nothing need be sent when the caller is not speaking. Current interest in VoIP is primarily driven by the capability to get international calls at local rates by routing voice traffic over the Internet.

Long term interest in VoIP is in the convergence of today's networks into a single network for voice and data traffic. This would result in economies for the network operator and greater opportunities to inte.g.rate voice and data services.

IRIDIUM®

IRIDIUM®is a communications system comprising a constellation of 66 low-earth-orbiting (LEO) satellites forming a mobile wireless system allowing subscribers to place and receive calls from any location in the world.

Originally conceived and developed by Motorola, the satellite constellation is connected to existing terrestrial telephone systems through a number of gateway ground-stations. IRIDIUM Inc. was established as a separate company in 1991 to develop and deploy the network, with Motorola as the prime contractor for the IRIDIUM® system, supplying satellites, gateways, and communication products. IRIDIUM® handsets are manufactured by Motorola and Kyocera. The IRIDIUM® system became commercially active on November 1 1998.

Further information: www.iridium.com

Java™

Java™ is a relatively recent computer programming language developed by Sun. It embodies many of the newer software development productivity and security features, such as object-oriented design and reuse. Java™ is designed to operate on any computer and interprets the program as it runs. This gives added benefits of high security, small program size traded-off by slower execution speed. It has been very popular for use with web browsers for these reasons, but is also finding its way into mainstream products from PC office applications to embedded controllers. There are four levels of Java capability which are supersets of each other: Java Card (used on Smartcards), Embedded Java™ (used in controllers with little or no user display), Personal Java™ (used in handheld organisers etc) and the full Java™.

Java Card

In July 1997, Sun announced the first specification of a Java Card. This enabled, for the first time, the implementation of intelligent agents in smart cards for mobile phones. An intelligent agent is

essentially a subset or compilation of computer code that is designed to support a specific function or set of functions. When the code module is launched it can be routed to a host or card-resident application where it is validated to serve its designated purpose. For example, a code module might be used by a service provider to allow a subscriber to search remotely for the telephone numbers of specific services such as plumbers or lawyers. The user might then go off-line to make calls to other parties. The intelligent agent would trigger a search for the required information and, when available, would take the data and send it to the subscriber's telephone smart card. Effectively, the addition of Java modules, known as applets, enable a smart card to support all the capabilities of a standalone computer running a specific application program. The Java Card specification provides a number of opportunities for smart card-based applications, and can support 8, 16 and 32 bit microprocessors. Improved response time on today's faster cards - up to 32kbps - allows for the faster downloading of more applets.

MeXe - Mobile Execution Environment

Likely to be based on Java technology, MeXe will enable WAP (Wireless Application Protocol)-enabled devices to offer a wider range of features with greater security and flexibility. MeXe will also enable greater control of telephony features than is possible with WAP alone.

Mobile e-Commerce

Mobile e-commerce is exactly the same as e-commerce except that the access mechanism is via a wireless phone or terminal rather than the fixed telephone network. The security aspect of transactions is addressed by the encryption inherent in the GSM specification. Internet access is being addressed by initiatives such as the Wireless Application Protocol (WAP) which provides an easy-to-use system for Internet access from mobile terminals.

SIM Toolkit - Subscriber Identity Module Application Toolkit

In the initial realisation of GSM, the SIM card played an essentially passive role, providing the user with the necessary authentication to access the network and storing the GSM encryption algorithms that ensured speech security. The SIM Toolkit extends the role of the SIM card, making it a key interface between the mobile terminal and the network. Using the SIM Toolkit, the SIM card can be programmed to carry out new functions. These include the ability to manipulate the menu structure of the mobile terminal to provide new, tailored options – for instance the handset could provide a menu for 'domestic' use and a menu for business use. Either way, the phone becomes personalised to the individual and therefore user-friendly.

Smart Cards

The original GSM Subscriber Identity Module (SIM) cards provided an individual identity for each mobile user, handling issues such as authentication and providing storage for basic user data and network information. The current generation of SIM cards contain integrated silicon chips which extend the intelligence and capability of the card and provide the user with access to a vast range of new card-enabled (as opposed to network-enabled) applications. The key to smart cards is the SIM Toolkit which is a standard set of program tools stored on the chip within the SIM card. These tools, combined with an application dependent code, can be used to run remote applications downloaded by the operator and accessed via the phone.

Smart Phones

Traditionally the mobile phone has been exclusively a device for voice telephony, the paradigm being the PSTN fixed phone. As GSM networks evolved to deliver new mobile data driven applications, users increasingly demanded new functionality on their mobile terminals to enable them to use these new services effectively. Optimised for narrowband communications and offering limited display capabilities, traditional GSM phones were unable to satisfy these demands.

The solution was the development and commercialisation of 'smart phones', new GSM terminals with enhanced display capabilities and new functionalities which enabled users to access their email, faxes and company intranets easily and quickly. The paradigm ceased to be the PSTN phone and became the palm top or laptop computer. Smartphones have larger displays, often a QWERTY or touch-sensitive keypad, and specialised built-in software linked to specific services and applications.

Symbian

Formerly Psion Software, Symbian is a joint venture between Psion, Ericsson, Nokia and Motorola to promote the EPOC operating system for wireless information devices. Symbian's main product is EPOC (derived from epoch – the beginning of an era), a 32-bit operating environment which has already been proven in the Psion Series 5 palmtop computer. EPOC comprises a suite of applications, customisable user interfaces, connectivity options and a range of development tools.

Symbian and its partners are working to facilitate key mobile standards, including Wireless Application Protocol (WAP), Bluetooth and Java. The addition of the Starfish TrueSync technology to Symbian's EPOC combines two technologies which have been specifically developed to accommodate the constraints of mobile computing and telecommunications devices while providing intuitive, powerful applications and connectivity with desktop and mobile devices.

Telematics

Telematics is a wireless communications system designed for the collection and dissemination of data. Applications include vehicle-based electronic systems, mobile telephony, vehicle tracking and positioning, on-line navigation and information services and emergency assistance. Static applications include stock control (automatic ordering), and monitoring of utilities meters.

TIPHON - Telecommunications and Internet Protocol Harmonisation over Networks

TIPHON is an ETSI project designed to support the market for voice communications and related voice band communications between users. It will ensure that users connected to IP-based networks can communicate with users on circuit-switched networks such as GSM.

TIPHON is being developed within ETSI by more than 40 member companies with the goal of achieving a global standard. To achieve this goal ETSI is working with other leading standardisation bodies such as the ITU and the IMTC Voice over IP Activity Group.

Tri-Band

Specific to handsets, a tri-band cellular phone will operate on three different frequencies, depending on the available network. Outside America, the GSM frequencies used are 900MHz and 1800MHz.

'American GSM', or PCS, operates at 1900MHz. The introduction of tri-band phones is a further step towards true worldwide roaming.

TrueSync™

TrueSync, developed by Starfish, is a technology which enables optimal synchronisation of wireless calendars, address books, action lists and memoranda. It provides multi-point, one-step synchronisation of wireless and wireline devices, desktop applications and server-based applications and services. TrueSync allows users to enter information once anywhere and synchronise it everywhere. It also enables the development of ultra-thin wearable products without the loss of performance or quality, optimising the battery life and memory capacity. Starfish was acquired by Motorola in 1998.

UMTS - Universal Mobile Telecommunications System

UMTS is the European member of the IMT2000 family of third generation cellular mobile standards. The goal of UMTS is to enable networks that offer true global roaming and can support a wide range of voice, data and multimedia services. Data rates offered by UMTS are: vehicular - 144 kbit/s; pedestrian 384 kbit/s; in-building 2Mb/s.

These new 3G networks will build on the success of GSM, and on the GSM operators - existing investment in infrastructure. The first stage of service and network evolution is from today's GSM systems, through the implementation of GPRS, to commercial UMTS networks expected from 2001.

Many of the original goals of UMTS are being met by the evolving GSM standard such as global roaming and personalised service features. The major differentiators of UMTS are: a new air interface operating at around 2GHz which will offer superior performance to GSM in terms of higher data rates and capacity, and a packet-based network architecture which supports both voice and data services.>

Unified Messaging

In the mobile environment, unified messaging means providing an individual user access, through his or her mobile terminal, to all the recognised messaging formats including voice mail, facsimile, pager, SMS and email. In today's working environment, messages are received in a wide variety of formats from a myriad of different sources. Unified messaging brings all these different messaging formats and services under a single umbrella, giving the user the opportunity to manage his data and information services for maximum benefit.

UP - Unwired Planet®

UP technology is advancing the development of an increasing number of innovative, interactive information services and applications for mass-market wireless handheld devices. Smartphones enabled with handheld device mark-up language (HDML) give mobile users interactive access to high-value information published in HDML on standard Web servers. Applications include corporate information such as orders, billing, shipment records, inventory availability, sales performance and any other information stored in corporate databases; public information such as financial news, stock quotes, airline schedules and weather forecasts and any other information available on the Internet; and personal information such as calendar, address book and email.

HDML-enabled smartphones can dial mobile voice calls under application control. Examples of data/voice interaction include calling back the sender of a page or calling a travel agent after receiving an alert that a flight has been delayed. These smartphones can also route information from Web servers to fax machines, enabling mobile users to print invoices, electronic mail, stock charts, or other documents.

VoiceXML™ - (Supplied by the VoiceXML Forum)
VoiceXML™ - Based on the World Wide Web Consortium's industry-standard eXtensible Markup Language (XML), VoiceXML™ provides a high-level programming interface to speech and telephony resources for application developers, service providers and equipment manufacturers. As such, the language follows all of the syntactic rules of XML with semantics that support the creation of interactive speech applications.

Standardization of VoiceXML™ will: simplify creation and delivery of Web-based, personalized interactive voice-response services; enable phone and voice access to integrated call center databases, information and services on Web sites, and company intranets; and help enable newvoice-capable devices and appliances. VoiceXML™ is expected to expand access to the Internet through telephones and other devices using both speech and ordinary touch-tone user interfaces.

WAP - Wireless Application Protocol

The development of WAP is being driven by the WAP Forum, initially founded by Motorola, Nokia, Ericsson and Unwired Planet. Since its inception the WAP Forum has grown dramatically and now comprises over 80 members drawn from the world's leading telecommunications and software companies.

WAP is a technology designed to provide users of mobile terminals with rapid and efficient access to the Internet. WAP is a protocol optimised, not only for use on the narrow band radio channels used by second generation digital wireless systems but also for the limited display capabilities and functionality of the display systems used by today's mobile terminals. WAP inte.g.rates telephony services with microbrowsing and enables easy-to-use interactive Internet access from the mobile handset. Typical WAP applications include over-the-air e-commerce transactions, online banking, information provisioning and messaging. WAP will enable operators to develop innovative services to provide differentiation in competitive market environments.

Further information: www.wapforum.org

xWireless Enterprise

Wireless Enterprise is defined at Motorola as a total solution delivering seamless on site and off site communications mobility, using the same handset therefore – making the mobile phone the primary phone. The mobile handset allows access to corporate specific information and applications, such as directory look up or ordering schedules/price lists. Existing corporate numbering plan and voicemail systems are fully integrated. The solution provides an industry standard data capability for home and visiting laptops. A competitive tariff package is essential.

Such solutions deliver the business benefits of mobility to the workplace, enabling business process applications such as Hot Desking.

Motorola's purpose designed in-building GSM service delivery platform -
MCell Horizon office delivers the capacity required for this application exactly where required. Small, discreet head units are deployed throughout the building, connected back to a cluster controller using existing telephony or LAN cabling.