

By Mobile Streams

See also http://www.mobileMMS.com

Issue Date: 1st November 2001

Copyright © 2001 Mobile Streams Limited

1. INTRODUCTION

This white paper is a brief summary of the 260 page "**Data on MMS**" report written by Simon Buckingham and costing 495 US\$. This 260 page report is essential and unique reading for anyone engaged in the mobile messaging market. See <u>http://www.mobilemms.com/mmm.asp?link=1</u> for a full table of contents and to order.

2. EVOLUTION FROM TEXT TO MULTIMEDIA

Over time, the nature and form of mobile communication is getting less textual and more visual. Mobile messaging is evolving beyond text by taking a development path from SMS (Short Message Service) to EMS (Enhanced Messaging Service) to MMS (Multimedia Messaging Service). Mobile Streams already publishes its renowned SMS reports called "SMS Express" and "SMS Tech" and its EMS report "Yes 2 Enhanced Messaging".

The transition that we will see from SMS to MMS is akin to the revolution from DOS to Windows in the computing world. It was this change that took computing from the early adopter innovator category into the early majority and onwards into the late majority mainstream status. When you compare a text message or an operator logo with a multimedia message or screensaver, the difference is an order of magnitude. The main features of this transformation from text to multimedia are shown in the table below:

ТҮРЕ	CHARACTERISTICS	CONTENT REFORMATTING FOR MOBILE NECESSARY?	APPLICATIONS	SUPPORT	TIMEFRAME FOR AVAILABILITY
SMS/ Text Messaging	100-200 characters	Yes	Simple person to person messaging	All phones	1990s
Nokia Smart Messaging	Simple rudimentary images	Yes	Simple person to person messaging with a visual feel	Some networks and Nokia phones only.	1999 onwards
Enhanced Messaging (EMS)	Text messages plus simple media formats e.g. sound, animation, picture, text formatting enhancements	Yes	Simple person to person messaging with a visual feel	EMS standards expected to be widely adopted	2001 onwards
Multimedia Messaging (MMS)	Messages in multiple rich media formats e.g. video, audio plus text	Sometimes	Sharing still images between phones and PCs and later simple person to person messaging with a visual feel	MMS standards expected to be widely adopted	2002 onwards

SOURCE: MOBILE STREAMS

Page 2

www.mobileMMS.com

The Short Message Service (SMS) is the ability to send and receive text messages to and from mobile telephones. The text can comprise of words or numbers or an alphanumeric combination. SMS was created when it was incorporated into the Global System for Mobiles (GSM) digital mobile phone standard. The first short message was sent in December 1992 from a Personal Computer (PC) to a mobile phone on the Vodafone GSM network in the UK. Two-way SMS is supported on GSM, CMDA and TDMA networks.

The Enhanced Messaging Service (EMS) is the ability to send ringtones, logos and pictures to mobile phones and also to send and receive a combination of simple media such as melodies, pictures, sounds, animations, modified text and standard text as an integrated message for display on an EMS compliant handset. There are many different potential combinations of these media. For example, when an exclamation mark appears in the enhanced message, a melody could be played. A simple black and white image could be displayed along with some text and this sound effect. EMS is an enhancement to SMS but is very similar to SMS in terms of using the store and forward SMS Centers, the signaling channel and the like to realize EMS. There are no network modifications needed to support EMS. Only new phones supporting EMS are needed. The first EMS compliant handsets became available in mid 2001. EMS is a GSM and CDMA standard.

The Multimedia Messaging Service (MMS) is as its name suggests the ability to send and receive rich media messages comprising a combination of text, sounds, images and video to and from MMS capable handsets. The Multimedia Messaging Service (MMS) confers the ability to send still images such as mobile postcards, mobile pictures, mobile screensavers, mobile greeting cards, mobile maps and business cards. Additionally, moving images, cartoons and interactive video will also be supported by Multimedia Messaging (MMS). New mobile network infrastructure is needed for Multimedia Messaging (MMS)- in addition to implementing the new bearer services such as GPRS and 3G, new network elements such as Multimedia Messaging Relays and Stores will be needed. MMS is a service that will run over IP based mobile networks- initially GPRS networks and will later be ported to EDGE and 3G networks.

3. COMPARISON BETWEEN SMS AND MMS

The Short Message Service (SMS) is a very popular mobile messaging service, with tens of billions of SMS messages sent and received each month globally. MMS will want to tap into and replace some of the SMS traffic over time. It is therefore useful to compare SMS and MMS. SMS and MMS share some similarities and have some discontinuities, as detailed in the table below:

FEATURE	SMS	MMS		
Store and Forward (non real time)	Yes	Yes		
Confirmation of message delivery	Yes	Yes		
Communications Type	Person to person	Application to Person		
		Person to person		
Media supported	Text plus binary	Multiple- Text, images, video		
Delivery mechanism	Signalling channel	Data traffic channel		
Protocols	SMS specific e.g. SMPP	WAP and general Internet e.g. MIME, HTTP, SMTP		
Configuration	Simple telephone number	Diverse parameters		
Platforms	SMS Center	MMS Relay plus others		
Principle Applications	Simple person to person	Still images, person to person, server based MMS services e.g. video news		
User behavior	Discreet	Indiscrete		

SOURCE: MOBILE STREAMS

Both SMS and MMS are non-real time services- this means that there is an intermediate platform such as the SMS Center or the MMS Relay that the short or multimedia messages pass through. Another characteristic that SMS and MMS hold in common is the fact that both include confirmation of message delivery- the sender of the message can find out whether or not the message they sent was successfully delivered.

MEDIA SUPPORTED

The Short Message Service (SMS) supports text and binary as media, allowing for example, rudimentary images to be sent and received. The overwhelming majority of all

Page 4

www.mobileMMS.com

SMS messages are pure and plain text however. Multimedia messages on the other hand can be coded in various media from text to images to sounds to video clips to a combination of these. As such, the MMS is a much more complicated and powerful service that supports far more media and rich media. For this reason, SMS is to mobile phones what DOS was to PCs whereas MMS is to mobile phones what Windows was to the PC. This is a revolutionary step, requiring EMS in the middle to steer an evolutionary migration path in mobile messaging. It also mandates terminal negotiation between network and phone to assess capabilities. SMS is the Lowest Common Denominator that all phone support, MMS is a complex service where different phones will have varying media support. Whereas SMS is integrated into every mobile phone, whether that phone also supports EMS, WAP or MMS, MMS clearly requires new terminals.

DELIVERY MECHANISM

All short messages are sent and received over the signaling channel, a channel which is an additional transport mechanism on GSM networks over and above the radio channels themselves. The signaling channel is a little like the hard shoulder or on ramp on a motorway/ expressway- it runs parallel to the traffic lanes themselves. SMS can be transmitted concurrently to other data types- text messages can be sent and received whilst the user is also on a voice, Circuit Switched Data or Fax call.

Multimedia messages on the other hard will be transmitted over the traffic channels themselves where other data types from voice to data will also be transported. The high capacity of 3G networks will mean that all these different traffic types can share the same radio resource without the likelihood of congestion. Using the traffic channel helps to overcome the capacity limitations of the SS7 signaling channel (see <u>www.mobileSS7.net</u> for more information).

In the GPRS world, therefore, multimedia messages will share limited network capacity with voice and other calls. This will have an important implication for quality of service, since multimedia message delivery reliability will be affected if networks are congested for any and all types of mobile services.

PROTOCOLS

When SMS was standardized in the early to mid-1990s, the Internet was an obscure academic communications medium. The original ETSI specifications for SMS closely mandated some areas of SMS and left others open to competition. As a result, proprietary protocols were developed- every SMS Center vendor developed its own interface such that application developers needed to implement different interfaces when porting their applications and services to network operators that had different SMS Centers. SMPP has recently become the defacto SMSC interface protocol, and is also likely to be used for certain MMS interfaces. Furthermore, an outdated protocol- X.25-remains a popular access mechanism for connecting applications to SMS Centers.

© Mobile Streams

<u>www.mobileMMS.com</u>

MMS on the other hand came of age in the Internet world where open systems and standard protocols reign and a wide range of these protocols exist. There is therefore no need to reinvent the wheel- existing standard protocols can be used- and MMS needs to tap into the vibrancy and innovativeness of the Internet companies if it is to maximize its full potential. MMS uses standard Internet protocols such as MIME (Multipurpose Internet Mail Extension) and SMTP (Simple Message Transfer Protocol) for access to the Multimedia Messaging Service Environment (MMSE). MMS is basically a presentation layer for basic email protocols.

While first MMS implementations will be based on enhanced WAP protocols (WAP MMS encapsulation), later MMS versions will also support non-WAP, standard-Internet protocols for communication between terminal and MMS relay, such as HTTP over TCP/IP.

CONFIGURATION

SMS is a completely simple service to use. There are no special numbers to rememberthe same number you use to call is the one you use to text to- and no additional parameters need to be set by the end user to successfully send the text message. MMS however is a very complex service with device negotiation and capability recognition and different classes of device with different media support. In the initial implementation of MMS using WAP, WAP Push is used such that concatenated SMS messages are used to transport the notification data (sender, size, retrieval URL, etc.) encapsulated in a WAP Push data unit. The 3GPP IP-based implementation proposal for MMS does not include SMS notification- it assumes a pure HTTP payload between the terminal and the relay. The 3GPP has defined a frame that allows for different implementations but assumes that the IP address used is fixed. This means that a lot of IP addresses will be needed for MMS- which will only be possible using IPv6 and not the current IPv4.

This difference in the complexity of notifications between MMS and SMS is yet another crucial one, that does not favor MMS.

PLATFORMS

In SMS, the SMS Center is the heart of the service, with all short messages of any type passing through an SMS Center to and from mobile phones. As such, there is one platform type that dominates SMS. Network operators have been 1 and 50 such SMS Centers, but there is only one platform type. Networks also tend to have other platforms such as value added services platforms.

With MMS on the other hand, there are several key platforms within the Multimedia Messaging Service Environment (MMSE)- including the MMS Relay, the MMS message store, the MMS User Database and other platforms including the existing platforms such as the SMS Center, voice mail platforms and the like. There may be several of these, and

Page 6

<u>www.mobileMMS.com</u>

they may be distributed as components in an open environment or integrated together in a single physical place.

The MMS infrastructure vendors have integrated the MMS Server and Relay into a single platform that they are calling the MMSC (MMS Center).

APPLICATIONS

In SMS, the vast majority of the total SMS traffic volume is accounted for by one application alone- simple person to person messaging in which people send messages such as "I'm bored" and "I'll be 5 mins late" from phone to phone. In the MMS world however, Mobile Streams is predicting that initial applications will be application to phone such as sent from Internet sites and based on still images- such as screen savers, mobile pictures, photos, postcards and the like. In other words, the notion that MMS will be like SMS in that person to person messaging is the key application is naï ve because for the first couple of years before MMS reaches critical mass, most MMS messaging will involve a PC to either initiate or terminate the multimedia message.

USER BEHAVIOR

One of the great advantages of SMS is that it is a very discreet communications medium that can be used "under the table" in meetings and at school for example. MMS is almost the opposite of this in user behavior terms insofar as people using a built in or attached camera in many scenarios will draw attention to themselves. On the other hand, SMS based enhanced messaging applications such as ringtones are also a means to draw attention to yourself, so perhaps the gulf in user behavior is not quite so great. This difference in user behavior is critical in educating users about MMS and is another factor that needs to be taken into account when it comes to MMS adoption rates.

SUMMARY

MMS takes a lot of the winning features of SMS but improves and extends those capabilities with richer media. The MMS standards have been designed in a very elegant way to take the best of text and improve the rest. However, it is also very clear that SMS and MMS are very different in the way the services are set up, with MMS being far more complex, and also in the types of applications and devices used and the user behavior. Mobile Streams' is predicting that these differences will have an adverse effect on the rate of take up of MMS, as people will continue to use text in many communication scenarios.

4. TIMESCALES

When a new service is introduced, there are a number of stages before it becomes established. Service developments for the Multimedia Messaging Service (MMS) will include standardization, infrastructure development, network trials, contracts placed, network roll out, availability of terminals, application development, and so on. These stages for the Multimedia Messaging Service (MMS) are shown in the table below:

DATE	MILESTONE			
2000/ 1	Continuing GPRS, 3G and MMS standardization with network architectures, terminal requirements and detailed standards.			
Early 2000	First MMS terminals were announced (Ericsson T68)			
2000/ 1	3G licenses for phase 1 spectrum were awarded by governments around Europe and Asia			
2001/ 2	GPRS networks are rolled out commercially around the world.			
Mid 2001	Release 4 of 3GPP MMS specs frozen. WAP-MMS specs (based on pre-Rel-4 3GPP specs) frozen in WAP 2.0 suite.			
	First MMS infrastructure contracts are awarded and is shipped for MMS trials and commercial services			
Late Q1 2002	First MMS terminal (Ericsson T68) is commercially available			
March 2002	Release 5 of 3GPP MMS specs frozen.			
Mid 2002	M-Services Stage 2 devices of which MMS is a compulsory part start shipping			
2002	MMS infrastructure trials and contracts are placed in Europe, North America, Asia etc.			
Late 2002	Commercial volumes of MMS terminals begin shipping.			
2003/4	MMS will have reached critical mass in terms of installed base of MMS capable terminals.			

SOURCE: MOBILE STREAMS

5. MILESTONES

Mobile Streams has developed a framework called "messaging milestones" to explain what steps are needed before Multimedia Messaging (MMS) can become a success and how to maximize MMS volumes and revenues. The dates given in the brackets are the approximate timelines for these milestones.

1. GPRS NETWORKS ROLLED OUT (2001)

MMS is a 3GPP standard that can be run over GPRS or 3G network bearers. As such, this investment in underlying network technology is a critical one before MMS can be rolled out as a service using that bearer.

2. GPRS AND MMS BILLING TARIFFS SORTED (2002)

It is important at this stage to start thinking about and investing in billing systems that can cope with MMS style services, including subscription services, service rather than volume based billing, revenue sharing arrangements with third parties and the like, so that the new MMS based services can be monetized.

3. FIRST GENERATION MMS CENTER TRIALS (2001, 2002)

Network operators purchase or trial first generation MMS Center. As we have seen from the contracts awarded so far, there are a number of MMSC trials being implemented by network operators, mainly in continental Europe. Obviously messaging infrastructure to manage MMS is crucial since without it, MMS cannot be offered.

4. BUSINESS PARTNERS PROGRAMME (2001)

It is important that network operators already start at this stage to think about partners for MMS services. Consumer services will use the MMS SMIL format so a content creator with that capability would help. Corporate oriented applications extending Unified Messaging or caller ID would constitute useful applications at this time too. A partner with a media bank for content and postcard and screen saver content could help here.

5. INITIAL MMS TERMINALS (2001, 2002)

New phones are needed before MMS can be used. As the initial MMS terminals become available, the first multimedia messages are sent. The very first MMS terminals, technically speaking, are PDA-type devices with GPRS equipment attached. The first M MMS capable devices such as the Ericsson T68 will become available. At this stage, the network, software partners and terminals are in place and services can start to be used, albeit on a small scale initially.

© Mobile Streams

6. GPRS ROAMING AND MMSC INTERWORKING FOR INTER-NETWORK MESSAGE TERMINATION (2002)

The addition of interworking between network operators who are competing in the same geographical market gives customers to all networks the opportunity to use MMS in the same way as they do voice. Just as they can make a voice call to each other's phones, so too can they send multimedia messages to each other. Enabling this capability can rapidly increase the number of available messaging destinations, thereby increasing the value and use of MMS.

7. MMS TERMINALS AND SERVICE FOR PREPAY

The next increase in MMS traffic volumes will be caused by the introduction of MMS terminals on prepay packages. Network operators face an issue in that they want to subsidize MMS terminals to attract usage but do not know what return on that subsidy they will get on a prepay tariff with no fixed contractual length. The youth market was the early adopter of SMS and is likely to be interested in MMS, yet the terminals are likely to be relatively sophisticated, and therefore expensive.

8. RANGE OF INTEROPERABLE TERMINALS (2002, 2003)

Obviously it is important that a choice of different terminals is available to potential MMS users from a range of terminal manufacturers. All of these terminals must closely conform to the 3GPP and WAP-MMS specifications, and interwork with handsets and MMS infrastructure from a range of different vendors.

9. END USER AWARENESS AND EDUCATION

Obviously need user awareness and education are important although MMS is expected to grow very quickly in this regard since it is instantly clear from using an MMS capable device that the messaging richness is dramatically improved compared to SMS and text messaging.

As such, there are various steps that mobile network operators can and should take to spur the initial development of MMS usage. Each of these steps is complementary and useful in making MMS a success. All of the stages are crucial to the overall success of MMS. It is not until these steps are in place that MMS can start to really succeed. These are the initial factors- networks, services, terminals, billing- before the MMS traffic can really start to take off.

Page 10

www.mobileMMS.com

6. TECHNICAL FEATURES

The enablers for Multimedia Messaging (MMS) have their roots in the changes that are taking place at all levels within the mobile Internet. Enabling bearers such as GPRS, EDGE and 3G are becoming available. Enabling technologies such as Bluetooth, WAP, MExE and SyncML are all initiatives that support this new direction toward the Mobile Internet. We are also seeing new categories of multifunctional devices such as MP3 phones being implemented.

The 3GPP has been studying the limitations of SMS and the Multimedia Message Service (MMS) is the answer to the new messaging market requirements. Infrastructure vendors see Multimedia Messaging as an evolution in mobile messaging as the user moves from SMS to EMS to MMS. The Multimedia Messaging Service (MMS) is according to the 3GPP standards "a new service which has no direct equivalent in the previous ETSI/GSM world or in the fixed network world." Lets introduce the features of this innovative new service:

1. MMS is a presentation layer for email such that it uses underlying standard email protocols but presents that email in a compelling design.

2. MMS will enable messages to be sent and received using lots of different media formats and types including text, images, audio and video.

3. As new more advanced media become available, more content rich applications and services can be offered using the MMS service environment.

4. The Multimedia Messaging Service (MMS) introduces rew messaging platforms to mobile networks in order to enable MMS. These new platforms have been designed to interact with legacy mobile platforms such as SMS Centers. The new platforms include MMS Relay(s) and MMS User Databases.

5. MMS is like SMS a non-real time service- a relay platform routes multimedia messages to MMS Servers.

6. The Multimedia Messaging Service (MMS) is designed to be future proof. As mobile networks evolve and new media become available, the aim is to make the standards as backwards and forwards compatible as possible.

7. Access to MMS services should be independent of access point- multimedia messages should be accessible through 3G and 2G mobile networks, fixed networks, the Internet etc. This is where common message stores will be an important enabling technology. To facilitate interoperability and universal messaging access, MMS will comply with Virtual Home Environment (VHE). VHE is a 3G concept that simply lets customers have seamless access with a common look and feel to their services from

© Mobile Streams

home, office or on the move and in any city as if they were at home. The Virtual Home Environment (VHE) permits the user to manage his services (including non-realtime multimedia messaging handling) via a generic user profile, permitting, for example, all different types of messaging to be presented to the user in a unified and consistent manner. (See <u>www.mobileVHE.com</u> from Mobile Streams for more information.)

8. The concept of a user profile has been included in the MMS standards. This user profile is stored in the mobile network and is user defined and managed via the Internet and determines which multimedia messages are downloaded immediately to the user and which are left on the server for later collection. The user may also choose to receive notifications of certain multimedia message types.

User profiles are important for several reasons including the fact that different MMS devices will support different levels of capability. The user profile will also allow the user to control access and accessibility for multimedia messages that will be mobile originated and mobile terminated. The user profile will include filtering rules and routing tables for unsolicited or undesirable messages.

9. Although MMS is being standardized by the 3GPP, in fact MMS services can be offered on any IP based air interface such as GPRS (General Packet Radio Service, so called 2.5G) or EDGE networks. The Multimedia Messaging Service (MMS) is a service environment that interworks with and allows multimedia messages to be transmitted across IP based mobile networks. See <u>www.mobileGPRS.com</u> <u>www.mobilEnhancedData.com</u> and <u>www.mobile3G.com</u> and the "Success 4 GPRS" and "Yes 2 3G" reports for more information on these bearer networks.

10. Content Scaling (e.g. downscaling of images) and Content Transformation (e.g. conversion of one audio format into another) have been considered in the MMS standardization process.

In sum, the Multimedia Message Service (MMS) provides an intelligent environment for multimedia mobile messaging.

7. ARCHITECTURE ELEMENTS

This next section gives an overview into the technical implementation of MMS. It quotes heavily from the 3GPP specifications, in particular 3G TS 23.140, functional description of MMS.

The Multimedia Messaging architecture has a number of key elements that have been defined and incorporated into a Multimedia Message Service Environment (MMSE). The concept of the "service environment" has been used in the past, for example in Intelligent Network (IN) solutions with the CSE (Camel Service Environment).

The MMS architecture contains several key platforms that interwork with each other to provide the MMS service. The key elements defined by the 3GPP are:

- MMS Relay
- MMS Server (or servers)
- MMS message store (or stores)
- MMS User Agent
- MMS User Databases

It is important to note that MMS infrastructure vendors are integrating MMS platforms such as an MMS Relay and MMS Server and labelling them as an "MMSC"- MMS Center.

To understand these platforms, think about the internal organs of human beings. The MMS Relay is like the heart of the service, which pumps content around the body. The MMS Server(s) is like the other organs that perform other related functions. The MMS message store(s) store related fluids that get passed around. The MMS User Databases contain the profiles that decide how the multimedia messages are transmitted and displayed. The MMS User Agent is a like the eyes- it is the external place that the processed information is displayed and viewed on.

This architecture allows multimedia access to all types of different information with a range of servers providing access to new and legacy services. This allows operators to consolidate access to multiple applications from a single architecture.

The diagram below shows that multimedia messaging (MMS) may encompass many different network types which can be connected by standard IP (Internet Protocol) messaging formats such as SMTP (Simple Mail Transport Protocol), MIME (Multipurpose Internet Mail Extension) etc. This approach enables messaging in 2G and 3G mobile networks to be compatible with Internet messaging systems.

© Mobile Streams

<u>www.mobileMMS.com</u>



SOURCE: 3GPP

Having discussed the criteria for selecting an MMS vendor, the MMS infrastructure vendors will now be reviewed. The profiled companies are ADC Enhanced Services, CMG, Comverse, Ericsson, Logica, Materna, Motorola, Nokia, Openwave Systems, SchlumbergerSema, Siemens, Tecnomen and Unisys.

Page 14

www.mobileMMS.com

MMS VENDOR	END TO END	VISION/ STRATEGY	KEY PLATFO RM	SMS	WAP	VOICE	UM	IP	CONT RACT	PART NERS
ADC	LOW	MED	UM	MED	LOW	MED	MED	LOW	LOW	N/A
CMG	MED	MED	SMS	HIGH	HIGH	LOW	HIGH	MED	HIGH	MED
Comverse	MED	MED	UM	HIGH	MED	HIGH	HIGH	LOW	MED	MED
Ericsson	HIGH	MED	SMS	MED	HIGH	MED	MED	MED	HIGH	MED
Logica	LOW	MED	SMS	HIGH	MED	LOW	LOW	LOW	LOW	MED
Materna	MED	MED	New	LOW	HIGH	LOW	MED	LOW	LOW	HIGH
			Platform							
Motorola	HIGH	HIGH	SMS	MED	MED	LOW	LOW	MED	LOW	MED
Nokia	HIGH	MED	New platform	MED	HIGH	LOW	LOW	MED	MED	LOW
Openwave	MED	MED	Email	LOW	HIGH	MED	MED	HIGH	LOW	MED
Sema	LOW	MED	UM/ SMS	HIGH	LOW	MED	MED	LOW	LOW	MED
Tecnomen	LOW	MED	UM	LOW	LOW	HIGH	HIGH	LOW	LOW	MED
Unisys	LOW	LOW	UM	LOW	LOW	LOW	HIGH	LOW	LOW	LOW

8. COMPARISON OF MMS PLATFORM VENDORS

SOURCE: MOBILE STREAMS

NOTE: A rating of "HIGH" denotes a better ranking than "MED" and so on.

9. MMS APPLICATIONS

Mobile Streams believes that the key services and applications based on MMS will be related to mobile entertainment and still images in a person to person environment.

MMS Success = Entertainment + Still Images + Person to Person

Lets look at this in more detail:

MOBILE ENTERTAINMENT

Mobile entertainment services are key for MMS. They account for the majority of i-mode traffic for example on the NTT DoCoMo network, and are a more popular application than mobile messaging as a category of nonvoice services. There are also likely to be substantial revenue premiums attached to mobile entertainment services- it is possible to charge a substantial premium for ringtones and picture messages in the EMS world, and this trend should be and is likely to be enhanced and maintained in the MMS world.

PERSON TO PERSON

About 90% of SMS traffic volumes are still accounted for by simple person to person messaging- people picking up their mobile phones and sending each other messages such as "HELLO HOW ARE YOU?" and "I WILL BE 5 MINUTES LATE". In such an environment, SMS is a medium and the end users self-create most of the content themselves.

In MMS, once an installed base of MMS users have been built up, person to person communications will also be the majority of the traffic volumes, although mobile phone users are likely to depict their feelings in visual rather than textual format. With MMS, they may compose a picture they created themselves on the MMS terminal or a photograph they took of themselves or something else or one they found on a Internet site and sent to their friend after adding text to the picture. One to one communications from one person to another are likely to still be the overwhelming application usage in the MMS world, with the added visual element.

Simple person to person messaging will start off slowly before MMS is widely available in the mass market, we still believe that sharing the moment will be a popular service for MMS.

Page 16

www.mobileMMS.com

STILL IMAGES

Still images such as screensavers, photographs, pictures, letters, postcards, greeting cards, presentations and static Internet pages can be sent and received over mobile networks just as they are across fixed telephone networks.

Two variables affect the usability of such applications- bandwidth and time- and they are inversely related. The faster the bandwidth, the less time is needed to transmit images, and vice versa. This is the reason why transmission of image based rather than textual information has not been a popular nonvoice mobile application until now- it takes too long given the slow data transmission speeds that were available prior to the introduction of GPRS mobile packet data.

Once captured, images can then be sent directly to Internet sites, allowing near realtime desktop publishing. The size of the file for a picture depends on the resolution and type of compression. Typically each picture is between 50K and 100K in the JPEG format. This can be transmitted quickly using mobile packet data networks, especially 3G networks.

Still image transmission is a much touted application for lower packet data services such as GPRS and beyond. Many people see still images as a killer compelling applications for GPRS and 3G.

Whilst moving images and video and the like represent a service that is compelling for sports replays, news clips and the like, it is thought that it will be a relatively small market size for MMS compared to the potential for transmitting still images.

10. MMS PHONES

ERICSSON T68

The Ericsson T68 will be the industry's first phone to support MMS (Multimedia Messaging) standards. The Ericsson T68 will also be the first mobile phone from Ericsson with MMS, a color display, digital imaging and audio capabilities. It is a radical phone in other ways too as this review will show. The T68 has been developed for GSM 900/1800/1900 and GPRS networks and will be shipping in volume in late Q1 2002.

The first impression of the T68 is that it is very small- fitting easily into the palm of your hand. It is immediately noticeable too that the T68 is also very light. The T68 measures 101 x 48 x 19 mm and weighs 85 grams. The T68 has a large 8 row, 256 color display which is very clear and easy to read. The backlit screen is very bright when the phone is in use but to conserve battery life, the standby mode turns the phone into an almost monochrome status.

The next thing after the size, weight and screen that the user notices is the joystick navigation. A small joystick is centered below the phone screen and is pressed to issue a command or noved up and down to scroll between menu options. There is also a scroll button like a "jog bar" on the side of the phone which can be used for example to find out the phone status (battery life and the like). The advanced state of the physical design of the T68 continues to impress with an integrated antenna and even the back of the phone is curvaceous and well thought out without being over-designed like some of Nokia's newest contrivances.

When you press the joystick, you get a visual menu with icons for different things like Messages appearing on the screen. The software MMI (man machine interface) is as surprisingly intuitive as the hardware design. Ericsson have finally and belatedly realized (along with the likes of Motorola and Siemens) that intuitive menus are essential for the usability of the device.

For example, the Messages menu lists voicemail, SMS, EMS, MMS, E-Mail, Chat, Area Information and Options and the Fun & Games menu features Themes, My pictures, Draw pictures, My sounds, Composer, Sound recorder, Games and Plug in Camera. The phone supports all kinds of messaging (SMS, EMS, MMS), the T68 even supports (unofficially) picture messages based on the Nokia Smart Messaging format! These cool features mean that you can personalize the phone with an entire theme (like Microsoft Plus! on PCs) with wallpapers, sounds, ringtones and the like. I alternated between the psychedelic and penguin modes depending on the time of the day! The sound recorder feature works as its name suggests- for example, I recorded the sound our credit card machine makes!

Page 18

www.mobileMMS.com

The T68 does not have an integrated camera but can support an add-on, but this is not an inhibitor, because the phone can use many services that do not rely on taking pictures with a camera. For example, the T68 supports downloading 60 x 80 color images (MMS pictures). You can also "Add Page" for sequences of multimedia pictures and control page timing- the rate at which the pictures refresh as a multimedia presentation is played. These "screen shows" and wallpaper backgrounds give more personalization options for the phone user.

Within the MMS sub-menu, you can get a feel for the similarities between SMS and MMS. The options are Validity Period, Read Reply, Delivery Report, Auto Delete, Auto Download, Service Centre and WAP profile. Many of these features such as delivery confirmation will be familiar to SMS users. When you right a new MMS message, you select a picture from the on-board pictures (which can be topped up over the air) and then add text to the picture and send it to a mobile number or email address.

The T68 is a close to perfect execution of how an MMS phone should be. It is incredibly difficult to fault any aspect of the phone. The only thing you can really say is that the price of the phone is not yet clear, although it is expected to be priced aggressively. The only other thing I could come up with as a criticism was that the metallic gold finish on the device appeared very flimsy and a little tacky up close, although no-one can mistake this phone for anything other than a very, very serious piece of cool kit. The MMS device supports a picture plus text, and not animated messages or other MMS features, although with slide shows and those features, most users will not know or care about this.

Ericsson is working to ensure that the T68 is interoperable with various MMS Centers from Nokia, Comverse and CMG as well as Ericsson of course. Ericsson are not working with Logica for terminal interoperability at this stage, which was a surprise. Ericsson has shipped the T68 for trials with Europolitan-Vodafone in Sweden for example.

Ericsson have set the bar very, very high with this mature implementation of the first MMS phone. Picking up the phone is really one of those pivotal moments in your life like when you browsed the Internet for the first time, when you realize just how great the difference between messaging tomorrow and soon will be. Because this revelation comes as a gadget in a phone package, it has an even stronger impact. The T68 really brings MMS to life.

Ericsson have found what seems to be the perfect form factor for MMS- a large enough screen size but not too large with great hardware and software navigation. Because Nokia and now Ericsson have developed intuitive user interfaces for MMS, this is not likely to be as big an issue as it was in the SMS world before predictive text input was introduced. It is perhaps no surprise that "T68" rhymes with "great", because the Ericsson T68 multimedia phone really is very, very great!

© Mobile Streams

<u>www.mobileMMS.com</u>

The product I tested is a software upgrade version which Ericsson will introduce during Q1 of 2002. The launch date has been delayed because according to Ericsson: "MMS development has not been as rapid as we expected which means we haven't been able to test the product as thoroughly against the various server vendors. Therefore, we cannot introduce MMS just yet." Ericsson will ship T68 without MMS during 2001 and introduce MMS in a later release towards the end of Q1. It will be possible to load MMS the first version of T68.

11. MMS STATISTICS

GLOBAL MMS MARKET FORECASTS 2002-2008

Mobile Streams is predicting that MMS will start to grow in 2002 but will not really take off until 2004. We expect MMS to continue growing in volume for many years to come beyond 2003, until at least 2009.

END OF YEAR (DECEMBER FIGURES)	MONTHLY TOTAL GLOBAL MMS MARKET SIZE	MONTHLY TOTAL GLOBAL SMS MARKET SIZE
2002	25m	62.4bn
2003	350m	80bn
2004	2.5bn	82.1bn
2005	10bn	79bn
2006	20bn	59bn
2007	50bn	40bn
2008	65bn	26bn

SOURCE: MOBILE STREAMS

These figures:

Denote the monthly figure for December of that year EXCLUDE all other message types such as SMS and EMS and show only MMS Are approximate Exclude Japan

ABOUT MOBILE STREAMS

Mobile Streams Limited was founded in January 1999 by Simon Buckingham. The company specializes in and focuses on ronvoice[™] mobile services such as the Short Message Service (SMS), Enhanced Messaging (EMS) and Multimedia Messaging (MMS). Mobile Streams runs an Internet site for each of these different services, all of which are accessible through <u>www.mobileFirst.com</u>.

Additional Mobile Streams publications include "Mobile Gaming", "SMS Tech", "SMS Express", "Success 4 GPRS", "Success 4 WAP", "Yes 2 3G", and "Yes 2 Enhanced Messaging". Visit <u>www.mobilestreams.com</u> and click on "Publications Zone" for a complete list and details.

Mobile Streams is an applied research company rather than a traditional theoretical research company. As such, it maintains several consumer websites aimed at end users including <u>www.mobileFlirting.com</u>, <u>www.ringtones.com</u> and <u>www.pictureMessaging.com</u>. As such, the quality of research conducted in its reports is of a high standard.

ALSO PUBLISHED BY MOBILE STREAMS

Success 4 GPRS – Simon Buckingham Published: August 2001 (255 pages) Just how important is GPRS? This new comprehensive report will tell you all that you need to know. For more information visit: <u>http://www.mobileGPRS.com</u> Price: 495\$US ISBN: 1929105258 Yes 2 Prepay – Gerald T. Christensen Published: August 2000 (175 A4 pages)

Written by Mobile Streams' Prepaid expert, Gerry Christensen, this 131 page report has been designed to help product and service providers and those investing in systems/solutions to make more informed business decisions.

For more information visit: <u>http://www.mobilePREPAY.com</u> Price: 495\$US ISBN: 192910541X

© Mobile Streams

www.mobileMMS.com

Page 21

Success 4 WAP – Simon Buckingham Published: February 2001 (200 pages)

The Wireless Application Protocol (WAP) is a hot topic that has been widely hyped in the mobile industry and outside of it. Mobile Streams originally produced its first WAP book, "Data on WAP", in July 1999. Due to rapid changes and developments this book was reissued as "Yes 2 WAP" in May 2000 and as "Success 4 WAP" in February 20001.

For more information visit: <u>http://www.yes2WAP.com</u> Price: 495\$US ISBN: 1929105355

YES 2 3G – Simon Buckingham Published: February 2001 (283 pages)

"YES 2 3G" presents an optimistic look at tremendously exciting possibilities that Third Generation/ UMTS technologies and applications enable. Timescales, profiles of all the major infrastructure vendors including the Japanese vendors, every mobile multimedia application, "At home with your futurephone"- mobile communications in the next few years, 3G Talking Points, all the 3G contracts awarded, the standards, handset alliances and partnership opportunities and much, much more are included in this report.

For more information visit: <u>http://www.mobile3G.com</u> Price: 495\$US ISBN: 1929105339

Mobile Positioning – Stephen M Dye and Dr Frank Baylin Published: April 2001 (273 pages)

"Mobile Positioning" is a book about mobile positioning systems - in particular, the Global Positioning System (GPS), non-GPS location techniques and Cell Broadcast. Although the book focuses primarily on the Global Positioning System (GPS), appendixes cover other non-GPS location schemes and Cell Broadcast in considerable detail.

For more information visit: <u>http://www.MobilePositioning.com</u> Price: 495\$US ISBN: 1929105398

SMS Tech – Simon Buckingham Published: July 2001 (199 pages)

"SMS Tech" is a report supporting the wide array of SMS related technologies and services that have been developed, particularly as application developers and operators alike have refocused WAP investments in SMS. Everyone wants help developing SMS applications and deploying them. "SMS Tech" covers all of these and many other issues in detail. It presents a roadmap for continued SMS success over the next couple of years.

For more information visit: http://www.mobileSMS.com Price: 495\$US ISBN: 1929105495 SMS Express – Simon Buckingham Published: July 2001 (228 pages)

This report is intended to show the how to maximize the use of, and therefore the revenue from, the Short Message Service. "SMS Express" covers the marketing and commercial aspects of SMS and as such is aimed at product managers, content providers, service providers and the like.

For more information visit: http://www.mobileSMS.com Price: 495\$US ISBN: 1929105479 Data on Bluetooth – Simon Duncan Published: July 2001 (207 pages)

Data on Bluetooth is the first report of its kind aimed at helping those implementing and deploying Bluetooth applications, services and products to gain the maximum business benefit from the technology. It aims to help with Bluetooth-related investment decisions by providing a clearer picture of the extent to which Bluetooth is in a position to deliver on its promises and the ways in which its potential can best be exploited.

For more information visit: http://www.mobilebluetooth.com Price: 495\$US ISBN: 1929105452

<u>NOTE</u>: To order any of the above publications, please visit our secure online ordering form at <u>https://www.mobilesms.com/ordering.asp</u>

LINKS TO RELATED INTERNET SITES

Mobile Streams operates more than 150 different live websites relating to mobile data. The sites include:

<u>www.mobile3G.com</u> All about the third generation of mobile phones- offering mobile multimedia.

<u>www.mobile4G.com</u> Fourth Generation Mobile Virtual Reality!

<u>www.mobiledatashop.com</u> Buy mobile data hardware and software from this one stop mobile data shop.

www.mobileDRM.com

Digital Rights Management- content copyright control over mobile networks, an essential enabler in 3G mobile phones

www.mobileEMS.com

The ability to send a combination of simple melodies, pictures, sounds, animations, modified text and standard text as an integrated message for display on an EMS compliant mobile phone.

<u>www.mobileFirst.com</u> Your on ramp to the mobile Internet with news, personalization, community, interactivity, search.

<u>www.mobileGPRS.com</u> All about the General Packet Radio Service.

<u>www.mobileInsiders.com</u> The Insiders Programme - Mobile Streams Platinum customer package

<u>www.mobileIPOs.com</u> Track the mobile Initial Public Offerings that are taking place in 2001 around the world with our extensive analysis

www.mobilelatestnews.com The latest strategic News by Mobile Streams

<u>www.mobileMMS.com</u> All about Multimedia Messaging

Page 24

www.mobileMMS.com

www.mobilePatents.com

A database tracking patents awarded to mobile companies and news about patent disputes

<u>www.mobileScreenSavers.com</u> Screensavers for your mobile phone!

<u>www.mobileSMS.com</u> All about the Short Message Service.

www.mobileStreams.com

Our company's corporate website with all the information about our people, products and partners

<u>www.mobileViruses.com</u> Virus Protection on mobile phones and devices

www.mobileVMS.com Voice Mail Systems

www.mobileVoiceXML.com Voice XML

<u>www.mobilewap.com</u> The ultimate WAP search engine.

<u>www.nextmessaging.com</u> All about SMS, EMS and MMS messaging

<u>www.operatorlogos.com</u> Operator Logos for Nokia Phones

<u>www.picturemessaging.com</u> Send simple images between mobile phones! A picture paints a thousand words so test

<u>www.ringtones.com</u> Change the way your phone rings. Turn your phone into a personal jukebox!

<u>www.wirelessClueless.com</u> Your reality check on the rhetoric that surrounds the mobile Internet

<u>www.mobileWAPng.com</u> All about the Wireless Application Protocol (WAP)

out the next generation of mobile messaging!

© Mobile Streams

www.directspread.com About the direct spread 3G airlink!

www.email4mobiles.com Email on your mobile phones

www.FutureFoneZone.com

All about the next five years of mobile phones. View the exclusive photo gallery of 3G concept phones.

www.Games4mobile.com

All about games for mobile phones. Traditionally game playing has been tethered to the television or the PC, but increasingly gaming is getting mobile.

www.links2mobile.com Links 2 thousands of mobile sites

<u>www.mobile2home.com</u> Remote access to your home from your mobile phone!

<u>www.mobile3GSM.com</u> Live news feeds from the 3GSM World Congress in Cannes

www.mobile4mobile.com

The website for mobile comms professionals- workshops, conferences, reports, jobs- its all here

<u>www.mobileamericanews.com</u> The website to visit for the latest news on the American mobile market

<u>www.mobileasianews.com</u> All about mobile communications news in Asia

<u>www.mobileAus.com</u> Mobile News from Australia

<u>www.mobileBilly.com</u> Mobile billing systems

<u>www.mobileBluetooth.com</u> All about Bluetooth, a short area network standard.

www.mobileCAMEL.com

Page 26

www.mobileMMS.com

Customized Application for Mobile Enhanced Logic

<u>www.mobilecasestudies.com</u> Every month a new case study from a mobile network operator

www.mobileCDMA.com All about the CDMA mobile networks popular in the USA and Korea.

www.mobileCebit.com Hot news from the CeBIT show

<u>www.mobilecellbroadcast.com</u> All about Cell Broadcast, a means to broadcast the same message to customers with a mobile phone in certain areas

www.mobileChatting.com Chat and community services on mobile phones

<u>www.mobileChinaNews.com</u> News from the Chinese mobile market

<u>www.mobileChtml.com</u> All about Compact HTML, the protocol used by i-mode in Japan

<u>www.MobileConferences.com</u> All about mobile communications conferences being held around the world.

<u>www.mobileConn.com</u> All about mobile network Connectivity

www.mobileconsultancy.com About mobile communications consulting companies

www.mobileContentWorld.com
Content is king- read all about the mobile content industry here

<u>www.mobileCorporateEmail.com</u> Send and receive email from your corporate email account on your mobile phone/ device

<u>www.mobileCorporations.com</u> All about mobile deployments in corporations

www.mobileCSD.com All about Circuit Switched Data

© Mobile Streams

www.mobileMMS.com

Page 27

<u>www.mobileCustCare.com</u> Using mobile phones to provide customer care

www.mobileDataEvolution.com Understand the evolution paths for GSM, TDMA and CDMA

<u>www.mobiledevelopers.com</u> Your mobile application development community covering all technologies from SMS to WAP to GPRS to 3G

<u>www.mobileDiscuss.com</u> Interactive discussion on mobile topics such as SMS, WAP, GPRS, 3G etc.

www.mobileDispatches.com

All about Mobile Streams' monthly series of white papers about mobile communications services.

www.mobileEagents.com Mobile Electronic Agents

<u>www.mobileEIR.com</u> All about Equipment Identity Registers

<u>www.mobileEnablers.com</u> Embedded Handset Enablers e.g. PKI, DRM etc.

<u>www.mobileEnhancedData.com</u> All about Enhanced Data Rates for Global Evolution (2.75G or EDGE)

www.mobileExhibitions.com Exhibitions in the mobile communications industry

www.mobileFaxmail.com Mobile Faxmail services

<u>www.mobileFiletransfer.com</u> Transferring files over mobile networks

<u>www.mobileFinlandNews.com</u> Hot stories from a hot mobile market

<u>www.mobileGPS.net</u> All about the Global Positioning System (GPS)

Page 28

www.mobileMMS.com

www.mobileHSCSD.com High Speed Circuit Switched Data

<u>www.mobileimode.com</u> i-mode the NTT DoCoMo Japanese mobile Internet phenomenon

<u>www.mobileInstantMessages.com</u> All about accessing instant messaging on mobile phones

<u>www.mobileIPworld.com</u> The increasing use of the Internet Protocol (IP) in the mobile world

<u>www.mobileIVR.com</u> All about Interactive Voice Response (IVR)

www.mobileJargonBuster.com Your guide through the mobile acronym jungle!

<u>www.mobileJobdispatch.com</u> Dispatching jobs to mobile workers

<u>www.mobilejoblinks.com</u> All about recruitment services for the mobile industry.

<u>www.mobileJP.com</u> News from the Japanese mobile market

<u>www.mobileMags.com</u> Magazines and newsletters about mobile communications

www.mobileMarkups.com Mobile Markup Languages

<u>www.mobileMcommerce.com</u> All about Mobile Commerce.

<u>www.mobileMExE.com</u> All about the Mobile Station Application Execution Environment.

<u>www.mobileMiddleware.com</u> All about developing mobile applications more quickly and easily!

www.mobileMMD.com

© Mobile Streams

www.mobileMMS.com

Page 29

All about downloading music onto your mobile phone!

<u>www.mobileMMI.com</u> All about user interfaces and the Man Machine Interface (MMI)

<u>www.mobilenewsletters.com</u> All about newsletters for the mobile communications industry.

<u>www.mobileOSA.com</u> All about Open Services Access (OSA)

<u>www.mobileOutsourcing.com</u> All about outsourcing mobile platforms!

<u>www.mobilepacket.com</u> How to make a Packet out of Mobile Packet!

<u>www.mobilePKI.com</u> Public Key Infrastructure for mobile networks

www.mobilePlanners.com Mobile network planning

www.mobilePortalWorld.com All about mobile portals

<u>www.mobilePositioning.com</u> All about GPS and non GPS positioning system technologies and applications.

www.mobilePrepay.com

All about prepayment- a form of paying for mobile phone service in advance of using it.

<u>www.mobilePressReleases.com</u> Press Releases

<u>www.mobilepublications.com</u> All about publications for the mobile phone professional.

<u>www.mobileRemoteLANaccess.com</u> Remote Access to Local Area Networks

<u>www.mobileRetailers.com</u> Selling mobile phones and equipment over the Internet

Page 30

www.mobileMMS.com

<u>www.mobileRoamers.com</u> Taking your mobile phone overseas

<u>www.mobileServiceEng.com</u> Field service engineers using mobile networks

<u>www.mobileSIMtoolkit.com</u> All about SIM Application Toolkit!

<u>www.mobiless7.net</u> All about Signaling System number Seven (SS7)

<u>www.mobileSuppliers.com</u> Who is supplying whom with what for key technologies

<u>www.mobileSyncML.com</u> The SyncML synchronization standard

<u>www.mobileSysInt.com</u> Systems Integrators who will make corporate data available over mobile networks

www.mobiletelemetry.com All about Telemetry.

<u>www.mobileTesters.com</u> Testing network coverage

www.mobileThirst.com

The thirst quencher for your mobile phone- all the mobile services you could ever need on one website....

<u>www.mobileUMTS.com</u> All about the Universal Mobile Telephone System!

www.mobileUsim.com 3G Smart Cards

<u>www.mobileUSSD.com</u> All about the Unstructured Supplementary Services Data.

<u>www.mobileValueChains.com</u> End to end delivery of mobile services

www.mobileVentureCap.com

© Mobile Streams

VC investments in the mobile industry

<u>www.mobileVHE.com</u> All about the Virtual Home Environment

<u>www.mobilevideoworld.com</u> All about video services on mobile phones

<u>www.mobileVNOs.com</u> Mobile Virtual Network Operators

<u>www.mobilevoiceportal.com</u> Voice driven mobile portals

<u>www.mobileVOIP.com</u> All about using mobile networks to transmit voice over IP (VOIP)

www.mobileWcdma.com Wideband CDMA

www.mobileWebBrowsing.com Access the Internet on your mobile phone

<u>www.mobilewebtone.com</u> The Internet equivalent to today's dial tone.

<u>www.mobilewhitepapers.com</u> All about Mobile Streams FREE White Papers.

<u>www.mobileworking.com</u> Using mobile communications to change the way you work

www.mobileworkshops.com Workshops about mobile communications

<u>www.mobileXhtml.com</u> eXtensible HTML on mobile phones

<u>www.mobileYearly.com</u> Mobile Streams' predictions for the year ahead

<u>www.nonvoice4novices.com</u> All about the mobile data revolution.

Page 32

www.mobileMMS.com