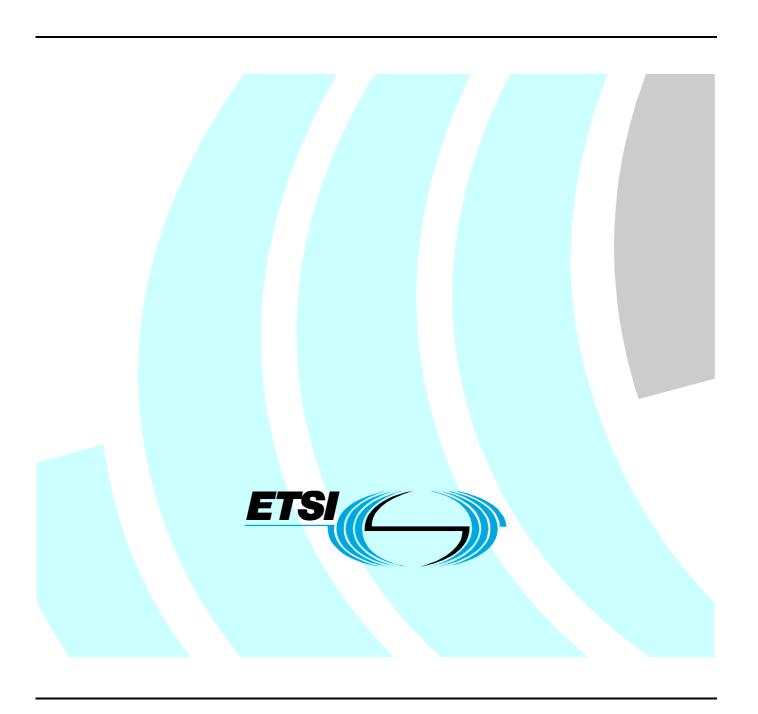# ETSI TS 102 164 V1.2.2 (2004-05)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Emergency Location Protocols

ETSI

Reference

RTS/TISPAN-03020-EMTEL

Keywords

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ETSI

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1   Scope

The present document specifies the protocol that is used by the local emergency operator to obtain the location information that is registered on the operator location server. It endorses and defines a profile of the LIF specification TS 101 [1] that are applicable to the emergency location information services.

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1]   LIF TS 101 Specification (v3.0.0): "Location Inter-operability Forum (LIF); Mobile Location Protocol".

NOTE: Available at http://www.openmobilealliance.org/_notes/main/lifdownload.html

[2]   EPSG Geodesy Parameters: "EPSG Geodetic Parameter Data Set Version 6.3".

NOTE: Available at http://www.epsg.org/.

[3]   NICC Specification ND1013:2002/11: "Emergency Location Information Interface".

NOTE: Available at: http://www.nicc.org.uk/.

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply:

emergency location immediate service: service used for querying of the location of a mobile subscriber that has initiated an emergency call

NOTE: The response to this service is required immediately (within a set time).

emergency location reporting service: service that is used when the wireless network automatically initiates the positioning at an emergency call

NOTE: The position and related data is then sent to the emergency application from the location server. Which application and its address are defined in the location server.

local emergency operator: designated emergency operator that can use the a Mobile Location Protocol operated by a location-based application to request MS location information from an operator location server

operator location server: location server with in the PLMN that, in the event of an emergency situation, a designated emergency operator can use the a Mobile Location Protocol to request MS location information from.

NOTE: An Operator Location Server may be a GMLC/MPC or other entity in the wireless network.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A-GPS Assisted Global Positionning System
APSG   Americas Petroleum Survey Group
EOTD   Enhanced Observed Time Difference
EPSG   European Petroleum Survey Group
FFS   For Further Study
ISO   International Standards Organization
LCS   Local Contact Service
LIF   Location Interoperability Forum
MLP   Mobile Location Protocol
MNO   Mobile Network Operator
MSC   Mobile Switching Centre
MSISDN Mobile Subscriber ISDN Number
POSC   Petrotechnical Open Software Corporation
QOP   Quality Of Position

4 MLP Lite 112

The present document:

- Identifies the clauses of the LIF TS 101 Specification [1] that are applicable to the emergency location information services.

- Does not identify how the mobile network operator determines location.

- Does not identify how the location information is passed between the emergency operator and the appropriate emergency authority.

- Does not identify how the location information is passed between the emergency operator and the appropriate emergency authority.

- Does not describe how the emergency call is established.

Figure 1 shows diagrammatically the scope of the present document.

Figure 1: Scope of the present document

The LI Forum has been affiliated and its work subsumed into the OMA, see the description of the OMA affiliates: http://www.openmobilealliance.org/_notes/main/affiliates_index.html and the press release on the availability of the LIF MLP specification, see: http://www.openmobilealliance.org/_notes/main/lifpress2.html.

Please see LIF TS 101 Specification [1] full LIF specification at http://www.openmobilealliance.org/_notes/main/lifdownload.html for further details and information.

Note that in this implementation of the LIF MLP protocol:

- ALL compulsory LIF elements are compulsory.

- Some optional LIF elements are compulsory.

Annex C lists a number of features, clause C.1 is an example of a current implementation, clauses C.2 to C.6 are for further study in future release of the MLP specification at OMA.

5   Name and address data

The LIF MLP [1] standard does not include name and address type fields but does include an extension mechanism to allow additional elements to be added.

A name and address extension is included in this specification to enable fixed line operators to adopt the same protocol as mobile operators to provide location information to emergency services:

- Potential data sources to populate these fields include:

    - installation address for fixed lines phones;

    - addresses "reverse geocoded" from latitude, longitude position of mobile handset;

    - location of pico cells within buildings.

Note that the referenced extension (and therefore the structure and elements within this extension) could be different for different countries, different operators and different emergency services.

EXAMPLE: If required the name and address fields and field formats could be defined differently to suit different countries, different operators or different emergency services.

6 LIF TS 101 v3.0.0 Endorsement

This specification is a profile of and is based on the interface defined by the Location Interoperability Forum (LIF). The following table identifies clauses within the LIF specification, and clarifies which options are applicable to a emergency location information service.

This specification identifies the minimum requirement. Elements not explicitly detailed in this clause should be considered to be "Not required". Additional optional elements may be implemented on a bilateral basis.

NOTE: In the following table, the term: "is required to be supported" is equivalent to "shall contain". However, it is understood that the definition of "is required to be supported" provides more clarity and detail than the definition of "shall contain" as the definition is captured from clause 0.7.2 of the PNO-ISC Specification 013 [3].

LIF TS 101 [1] section	Title	Profile requirement
1	**Revision History**	
2	**Introduction**	
3	**General**	
3.3	MLP extension mechanism	Required
4	**Mobile Location Service Definitions**	
4.1	Transport Protocol Layer Definitions	Required (See endorsement of Annex B of [1])
4.2	Element Layer Definitions	
4.2.1	Identity Element Definitions	The following elements are required to be supported, and where an element is a construction, which elements are required to be supported within the construction: • msid • msid o msid One **msid** element shall be included in an msids element)

4.2.3	Location Element Definitions	The following elements are required to be supported, and where an element is a construction, which elements are required to be supported within the construction:
		• **eme_pos**
		   o **msid**
		   o **pd**
		   o **poserr**
		• **pd**
		   o **time**
		   o **shape**
		   o **lev_conf**
		• **poserr**
		   o **result**
		   o **time**
		• **result**
		• **time**
		• **lev_conf**

LIF TS 101 [1] section	Title	Profile requirement

4.2.4	Shape Element Definitions	The following elements are required to be supported, and where an element is a construction, which elements are required to be supported within the construction:
		• **shape**
		   o **EllipticalArea**
		• **AngularUnit**
		• **Angle**
		• **Coord**
		   o **X**
		   o **Y**
		• **X**
		• **Y**
		• **EllipticalArea**
		   o **Coord**
		   o **Angle**
		   o **SemiMajor**
		   o **SemiMinor**
		   o **AngularUnit**
		• **SemiMajor**
		• **SemiMinor**

4.2.7	Context Element Definitions	The following elements are required to be supported, and where an element is a construction, which elements are required to be supported within the construction:
		• **Client**
		   o **Id**
		   o **Pwd**
		   o **Requestmode**
		• **Id**
		• **Pwd**
		• **Requestmode**
		• **servicetype**

4.3	Service Layer Definitions	
4.3.1	Header Components	
4.3.1.1	Context DTD	The following elements are required to be supported, and where an element is a construction, which elements are required to be supported within the construction: • **hdr** o **client**
4.3.3	Emergency Location Immediate Service	Required
4.3.3.1	Emergency Location Immediate Request DTD	The "**eme_lir**" shall contain the following element: • **msids**
4.3.3.2	Emergency Location Immediate Answer DTD	The "**eme_lia**" shall contain the following elements: • eme_pos, or • result • caller_location (optional)
4.3.5	Emergency Location Reporting Service	Required
4.3.5.1	Emergency Location Report DTD	The "**emerep**" shall contain the following elements: • eme_event • caller_location (optional)
4.3.7	General Error Message Definition	The "**gem**" shall contain the following elements: • result
5	**Elements and attributes in DTD**	
5.4	angle	Required
5.5	angularUnit	Required
5.17	EllipticalArea	Required
5.18	eme_event	Required
5.18.1	eme_trigger	Required
5.23	id	Required
5.27	lev_conf	Required
5.37	msid	Required
5.37.1	Type	Type shall be "MSISDN"

LIF TS 101 [1] section	Title	Profile requirement
5.37.2	enc	Enc shall be "ASC"
5.49	pwd	Required
5.54	result	Required
5.55	semiMajor	Required
5.56	semiMinor	Required
5.58	requestmode	Required
5.58.1	type	Type shall be "PASSIVE"
5.66	time	Required
5.72	X	Required
5.73	Y	Required
5.75	Service attributes	
5.75.2	ver	Required
6	Result codes and error codes	
6.1	Result codes	Required
7	References	
	References (normative)	
	References (informative)	
8	Appendix A (informative) : Adaptation to 3GPP LCS	
9	Appendix B - HTTP mapping	The lif-mlp-s (9211/tcp) port or the lif-mlp (9210/tcp) port shall be used. Location client shall use separate HTTP posts and NOT use pipelining for time critical requests to avoid that one request delays other requests. Location Server shall process and respond to the separate HTTP posts out of order.
9.2.1	Service Initiation DTD	The "**svc_init**" shall contain the following elements: **hdr** **eme_lir**
9.2.2	Service Result DTD	The "**svc**"_result shall contain the following elements: **eme_lia** **emerep**

6.1   Result codes (LIF defined)

This table defines the result codes that indicate the result of the request or individual positioning.

The error codes are divided in ranges:

0 to 99	Location server specific errors
100 to 199	Request specific errors
200 to 299	Network specific errors
300 to 499	Reserved for future use
500 to 599	Vendor specific errors

NOTE: For privacy reasons it might be needed to not report certain specific errors. In this case it is up to the implementation or configuration of the location server which errors will be reported.

These are the errors defined in LIF MLP V3.0.0. [1]. They may well change in later versions.

Resid	Slogan	Description
0	OK	No error occurred while processing the request
1	SYSTEM FAILURE	The request can not be handled because of a general problem in the location server or the underlying network
2	UNSPECIFIED ERROR	An unspecified error used in case none of the other errors applies. This can also be used in case privacy issues prevent certain errors from being presented
3	UNAUTHORIZED APPLICATION	The requesting location-based application is not allowed to access the location server or a wrong password has been supplied
4	UNKNOWN SUBSCRIBER	Unknown subscriber. The user is unknown, i.e. no such subscription exists
5	ABSENT SUBSCRIBER	Absent subscriber. The user is currently not reachable
6	POSITION METHOD FAILURE	Position method failure. The location service failed to obtain the user's position
101	CONGESTION IN LOCATION SERVER	The request can not be handled due to congestion in the location server
102	CONGESTION IN MOBILE NETWORK	The request can not be handled due to congestion in the mobile network
103	UNSUPPORTED VERSION	The Location server does not support the indicated protocol version
104	TOO MANY POSITION ITEMS	Too many position items have been specified in the request
105	FORMAT ERROR	A protocol element in the request has invalid format. The invalid element is indicated in ADD_INFO
106	SYNTAX ERROR	The position request has invalid syntax. Details may be indicated in ADD_INFO
107	PROTOCOL ELEMENT NOT SUPPORTED	A protocol element specified in the position request is not supported by the Location Server. The element is indicated in ADD_INFO
108	SERVICE NOT SUPPORTED	The requested service is not supported in the Location Server. The service is indicated in ADD_INFO
109	PROTOCOL ELEMENT ATTRIBUTE NOT SUPPORTED	A protocol element attribute is not supported in the Location Server. The attribute is indicated in ADD_INFO
110	INVALID PROTOCOL ELEMENT VALUE	A protocol element in the request has an invalid value. The element is indicated in ADD_INFO
111	INVALID PROTOCOL ELEMENT ATTRIBUTE VALUE	A protocol element attribute in the request has a wrong value. The element is indicated in ADD_INFO
112	PROTOCOL ELEMENT VALUE NOT SUPPORTED	A specific value of a protocol element is not supported in the Location Server. The element and value are indicated in ADD_INFO
113	PROTOCOL ELEMENT ATTRIBUTE VALUE NOT SUPPORTED	A specific value of a protocol element attribute is not supported in the Location Server. The attribute and value are indicated in ADD_INFO
201	QOP NOT ATTAINABLE	The requested QoP cannot be provided.
202	POSITIONING NOT ALLOWED	The subscriber does not allow the application to position him/her for whatever reason (privacy settings in location server, LCS privacy class).
204	DISALLOWED BY LOCAL REGULATIONS	The location request is disallowed by local regulatory requirements.
207	MISCONFIGURATION OF LOCATION SERVER	The location server is not completely configured to be able to calculate a position.
300 to 499		Reserved for future use
500 to 599		Vendor specific errors

7 MLP extension

This clause details an optional MLP extension. This provides a simple mechanism to transport name information and a freeform textual description of location, see [3].

Support of this extension is not mandatory.

7.1 Data type definition

```
<!--pno-isc_MLP_extension -->

<!ENTITY       % extension.param      'caller_location?'>

<!ELEMENT      caller_location      (customer_name?, Address_line1?, Address_line2?,
               Address_line3?, Address_line4?, Address_line5?, Address_line6?, postcode?)>
<!ELEMENT      customer_name        (#PCDATA)>
<!ELEMENT      Address_line1        (#PCDATA)>
<!ELEMENT      Address_line2        (#PCDATA)>
<!ELEMENT      Address_line3        (#PCDATA)>
<!ELEMENT      Address_line4        (#PCDATA)>
<!ELEMENT      Address_line5        (#PCDATA)>
<!ELEMENT      Address_line6        (#PCDATA)>
<!ELEMENT      postcode             (#PCDATA)>
```

7.2 Elements and attributes

7.2.1 Customer_name

Description:	
Specifies the name of the customer associated with the geographic info	
Format:	Char String
Defined values:	-
Default value:	-
Example:	<customer_name>Mr Benn</customer_name>

7.2.2 Address_line1

Description:	
Specifies a line of text providing a freeform textual description of the associated location information	
Format:	Char String
Defined values:	-
Default value:	-
Example 1:	<line1>52 Festive Road</line1>
Example 2:	<line1>Heathrow Terminal 4 Check In Desks</line1>
NOTE: No formatting of the address should be assumed i.e. a full postal address could be defined using one line element, or split over several lines using the line1, line2, line3 etc elements.	

7.2.3 Address_line2

As 7.2.2

7.2.4 Address_line3

As 7.2.2

7.2.5   Address_line4

As 7.2.2

7.2.6   Address_line5

As 7.2.2

7.2.7   Address_line6

As 7.2.2

7.2.8   Postcode

Description:	
Specifies the postcode associated with the location information	
Format:	Char String
Defined values:	-
Default value:	-
Example:	<postcode>SW1 1AA</postcode>
NOTE: Can be used in the case that the postcode is known (e.g. in-building, pico cell coverage).	

7.3   Examples of usage

For examples of the use of these this MLP profile and extensions, see Annex A.

8   European Petroleum Survey Group

The European Petroleum Survey Group (EPSG) was formed in 1986. It comprises specialist surveyors, geodesists and cartographers from European Oil Companies. Meetings are held twice yearly to discuss survey and positioning topics within those areas of oil industry business where cooperation is generally agreed to be mutually beneficial.

A geodesy working group maintains a relational database of EPSG geodetic parameters.

The EPSG aims to help member companies, and where relevant others, by the dissemination of information which by generally improving oil industry survey practices and procedures, will contribute to increased efficiency, enhanced quality, improved safety of operations and the protection of the environment.

Through its membership of specialist professionals, the EPSG is qualified to offer collective expert advice to member companies within the fields of geodesy, surveying, positioning and cartography where they relate to oil exploration, development and production operations, see Annex B of the present document.

Annex A (informative):
Example messages

This annex provides example message formats associated with the defined sub-set of the LIF specification described in the present document.

A.1 Emergency location immediate request

```
<?xml version="1.0" ?>
<!DOCTYPE svc_init SYSTEM "MLP_SVC_INIT_300.DTD">
<svc_init ver="3.0.0">                                    Service initiation for MLP Version 3.0.0
    <hdr ver="3.0.0">                                     Header for MLP Version 3.0.0
        <client>                                          Who is requesting this location fix
            <id>emergency operator</id>                   Emergency operator registered user name for login
            <pwd>bigcrash</pwd>                           Emergency operator password for login
            <requestmode type="PASSIVE"/>                 Its not the ACTIVE user requesting a location fix
        </client>
    </hdr>
    <eme_lir ver="3.0.0">                                 Emergency Location Immediate Request for MLP
                                                          Version 3.0.0
        <msids>                                           Identifier of device to be located
            <msid type="MSISDN">447770123123</msid>       Identifier is a MSISDN formatted as Country Code
                                                          + Phone Number (GSM/3GPP should conform to
                                                          TS 123 003)

        </msids>
    </eme_lir>
</svc_init>
```

A.2 Emergency location immediate answer - valid response

```
<?xml version="1.0" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_300.DTD" [
<!ENTITY pno-isc_MLP_extension 'pno-isc_MLP_extension.dtd'>
]>
<svc_result ver="3.0.0">                                  Service result for MLP Version 3.0.0
    <eme_lia ver="3.0.0">                                 Emergency Location Immediate Answer for
                                                          MLP Version 3.0.0
        <eme_pos>                                         Position answer
            <msid type="MSISDN">447770123123</msid>       Position is for this MSISDN (formatted as
                                                          Country Code + Phone Number) (GSM/3GPP
                                                          should conform to TS 123 003)
            <pd>                                          Position description
                <time utc_off="+0100">20020702115712</time>   Local Date and Time of phone when position
                                                          was measured.
                <shape>                                   Shape of uncertainty area
                    <EllipticalArea>                      It"s an ellipse (on the WGS-84 co-ordinate
                                                          reference system as default).
                        <coord>                           Coordinate of the centre of the ellipse
                            <X>N51.514</X>                Latitude in decimal degrees prefixed with N or
                                                          S
                            <Y>W0.102</Y>                 Longitude in decimal degrees prefixed with E
                                                          or W
                        </coord>
                        <angle>90.00</angle>              Angle in degrees of rotation of the ellipse
                                                          measured clockwise from north
                        <semiMajor>50</semiMajor>         Length of semiMajor axis in metres
                        <semiMinor>25</semiMinor>         Length of semiMinor axis in metres
```

```
                    <angularUnit>00</angularUnit>
                    <distanceUnit>00</distanceUnit>
                 </EllipticalArea >
              </shape>
              <lev_conf>80</lev_conf>


          </pd>
      </eme_pos>
      <caller_location>
          <Address_line1>2nd Floor</Address_line1>
          <Address_line2>Oftel</Address_line2>
          <Address_line3>50 Ludgate Hill<Address_/line3>

          <Address_line4>London</Address_line4>

          <postcode>EC4M 7JJ</postcode>
      </caller_location>
    </eme_lia>
</svc_result>
```

Length of angularUnit in degrees
Length of distanceUnit in metres

Indicates the probability as a percentage that the phone is located within the position area defined

Freeform textual description of location (e.g derived from pico cell coverage)

A.3 Emergency location immediate answer - error response

```
<?xml version="1.0" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_300.DTD">
<svc_result ver="3.0.0">
    <eme_lia ver="3.0.0">

        <eme_pos>
             <msid type="MSISDN">447770123123</msid>


          <poserr>
              <result resid="004"> UNKNOWN SUBSCRIBER
</result>
              <add_info>This space left blank</add_info>
              <time utc_off="±0100">20020702115712</time>

          </poserr>
      </eme_pos>
    </eme_lia>


</svc_result>
```

Service result for MLP Version 3.0.0
Emergency Location Immediate Answer for MLP Version 3.0.0
Position answer
Position is for this MSISDN (formatted as Country Code + Phone Number)
(GSM/3GPP should conform to TS 123 003)

Error code number and error code text

Additional information about the result
Local Date and Time of phone when position attempt was made

A.4 Example usage of MLP extension

```
<?xml version="1.0" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_300.DTD" [
<!ENTITY pno-isc_mlp_extension 'pno-isc_mlp_extension.dtd'>
]>
<svc_result ver="3.0.0">
    <eme_lia ver="3.0.0">

        <eme_pos>
             <msid type="MSISDN">447770123123</msid>


          <pd>
             <time utc_off="+0100">20020702115712</time>

             <shape>
                 <EllipticalArea>
```

Service result for MLP Version 3.0.0
Emergency Location Immediate Answer for MLP Version 3.0.0
Position answer
Position is for this MSISDN (formatted as Country Code + Phone Number)
(GSM/3GPP should conform to TS 123 003)
Position description
Local Date and Time of phone when position attempt was made
Shape of Location Area
It is an ellipse (on the WGS-84 co-ordinate reference system as default).

```
                <coord>                                  Coordinate of the centre of the ellipse
                    <X>N51.459</X>                       Latitude in decimal degrees prefixed with N
                                                         or S
                    <Y>W0.448</Y>                        Longitude in decimal degrees prefixed with
                                                         E or W

                </coord>
                <angle>90.00</angle>                     Angle in degrees of rotation of the ellipse
                                                         measured clockwise from north

                <semiMajor>50</semiMajor>                Length of semiMajor axis in metres
                <semiMinor>25</semiMinor>                Length of semiMinor axis in metres
                    <angularUnit>00</angularUnit>        Length of angularUnit in degrees
                    <distanceUnit>00</distanceUnit>      Length of distanceUnit in metres
            </EllipticalArea>
        </shape>
        <lev_conf>80</lev_conf>                          Indicates the probability as a percentage
                                                         that the phone is located within the position
                                                         area defined

    </pd>
  </eme_pos>
  <caller_location>
      <Address_line1>Heathrow Terminal 4 check-in desks   Freeform textual description of location.
      </Address_line1>
  </caller_location>                                     (e.g derived from pico cell coverage)
 </eme_lia>
</svc_result>
```

Annex B (informative):
European Petroleum Survey Group and other notes

B.1   EPSG Geodetic parameters

The European Petroleum Survey Group (EPSG) was formed in 1986. It comprises specialist surveyors, geodesists and cartographers from European Oil Companies. Meetings are held twice yearly to discuss survey and positioning topics within those areas of oil industry business where cooperation is generally agreed to be mutually beneficial.

A geodesy working group maintains a relational database of EPSG geodetic parameters. EPSG, through its geodesy working group, maintains and publishes a data set of parameters for coordinate system and coordinate transformation description. The data is supported through formulae given in guidance note number 7. The EPSG geodetic parameters have been included as reference data in the GeoTIFF data exchange specifications, in Iris21 (Petroconsultant's data model) and in Epicentre (the POSC data model). The parameters are maintained in an MS Access relational database and may be consulted on this site.

B.2   EPSG guidance notes

EPSG produces an occasional series of guidance notes for its member use. Some are made publicly available from this site.

Associations with other organizations PSG has:

- category A liaison membership of the International Standards Organization (ISO) Technical Committee 211, Geographic Information/Geomatics;

- a strong, but informal, relationship with the UKOOA Survey and Positioning Committee;

- a strong, but informal, relationship with the Petrotechnical Open Software Corporation (POSC) to which it provides geodetic advice and support through the EPSG geodesy working group;

- EPSG geodesy working group members maintain a liaison with the Open GIS Consortium over spatial referencing and coordinate transformation;

- EPSG maintains links with the Americas Petroleum Survey Group (APSG).

B.3   EPSG Geodesy parameters V6.3

In February 2002, the European Petroleum Survey Group (EPSG) completed and released the ISO-compliant version 6.1 data model and data set. The move to the new model was made to encourage standardization both across the Exploration and Production segment of the oil industry and in the geodetic community at large. Since that release, much new data has come available.

This new Version 6.3 [2] is the current EPSG release, distributed in an MS Access 97 database. It incorporates data received and verified since the release of version 6.1. There are no changes in the data model from version 6.1.

NOTE 1: Version 6.3 [relational] database is only available in MS Access v97 but can be converted to Access 2000.

NOTE 2: This zipped file is comprised of the version 6.3 database (MS Access 97) and associated documentation (in both Adobe Acrobat PDF and MS Word 97-2000& 6/95-rtf formats). The zipped file is approximately 2 Mb in size.

There are no significant changes in content from the v6.2.2, v6.2.1 and v6.2 versions of the database that are superseded by this v6.3 database. Some changes were made primarily to form controls to assist user conversion to Access 2000.

B.4   Cell-ID based location performance

When an emergency call is made, the 3GPP standards specify that the Cell-ID which is in use is stored - this is called INITIAL location in the standards and can be retrieved by a location server very quickly (typically about 1 s).

A location server can also cause a handset to be paged and the Cell-ID currently in use to be obtained and stored. This is called CURRENT location in the standards. Because paging the handset takes time, this CURRENT location can only be retrieved by a location server after a longer time (typically 3-8 s?).

As well as the retrieval time difference, the INITIAL location may well be different to the CURRENT location if the Caller is moving e.g. in a vehicle or train.

Already offered, performance of current CellID or CellID at the start of call, differs in different network implementations and technology.

Annex C (informative):
Proposed additional functionality

Annex C lists a number of features, clause C.1 is an example of a current implementation, clauses C.2 to C.6 are for further study in future release of the MLP specification at OMA.

C.1   Circle location configuration - additional shape to ellipse

LIF TS 101 [1] section	Title	Profile requirement
5	Elements and attributes in DTD	
5.10	CircularArea	Required

Description:	
The set of points on the ellipsoid, which are at a distance from the point of origin less than or equal to "r".	
Type:	Element
Format:	Char String
Defined values:	-
Default value:	-
Example:	<CircularArea srsName="www.epsg.org#4004" gid="some_thing"> <coord> <X>301628.312</X> <Y>451533.431</Y> </coord> <radius>240</radius> </CircularArea>

As defined in MLP TS 101 [1] from LIF Forum.

C.2   InBound roamers

In summary the visited MNO needs to know which of their MSCs the InBound roamer is connected in order to enable their Cell-ID based location to be found.

This would normally required the Visited MNO Operator to request this information from the InBound roamers Home MNO.

The Swedish 112 Mobile Location standard requires the MSC number to be passed to the emergency operator entity in the "Location Number" field of an ISUP "Initial Address Message".

The emergency operator entity can then pass this MSC Number to the visited network as part of the MLP message (standard optional field).

Protocol compatibility issue, need to investigate the availability of ISUP v4 EN 300 356 (see bibliography).

C.3 Proposed additional functionality - position fix type

C.3.1 Location technology selection

An issue with the ideas in MLP Lite was that the request would not allow the requestor to specify which location technology to use if more than one was implemented by an operator.

E.g. MNO implements both Cell-ID and Assisted GPS technologies. Cell-ID gives a quick inaccurate response whereas A-GPS gives a slow accurate response. The emergency operator may require both. E.g. Cell-ID based to initiate response despatch and then A-GPS to locate the caller more exactly.

MLP 3.1 allows the "eqop" element (already defined for Standard Immediate requests) to be included in emergency immediate requests.

Within "eqop" the element "resp_req" allows the Location technology required to be implied.

Values of "resp_req" allowed are as follows

NO_DELAY	No delay: The server should immediately return any location estimate that it currently has.
LOW_DELAY	Low delay: Fulfilment of the response time requirement takes precedence over fulfilment of the accuracy requirement.
DELAY_TOL	DEFAULT - Delay tolerant: Fulfilment of the accuracy requirement takes precedence over fulfilment of the response time requirement.
NOTE:	The interpretation of these values is defined in TS 122 071 and TS 129 002.

This parameter indicates what is important to the emergency operator (i.e. speed or accuracy) but how that is achieved within an MNO Domain with a particular User and a particular handset would be an implementation decision for each operator.

C.3.2 Background

From the proposed implementation of this functionality in July 2003 or soon after it is likely that some operators will be offering multiple position fix technologies. For example Cell-ID based plus EOTD and/or A-GPS.

The emergency operator has two functional requirements:

1) **A very quick response to location request** (accuracy not as important as response speed).

This enables the emergency operator to route the call to the correct emergency authority based on approximate geographic location, to question the caller more appropriately to establish the exact location using approximate location details and in most cases to despatch the nearest response vehicle.

2) **A most accurate response to a location request** (accuracy more important then response speed).

This may be required if the emergency authority cannot determine exactly where the caller is, for example after talking to the caller.

C.3.3 Issue

In a network providing more than one location technology, (e.g. both Cell-ID and A-GPS) these two requirements require two different requests.

By utilizing the standard LIF optional QOP parameters (e.g. horizontal accuracy and how long before a response is required) it may be possible for the emergency operator to request a Cell-ID fix and then a A-GPS fix but this would require the emergency operator to know the capabilities and necessary parameters for each network and each caller's handset and configure these in their software client.

This appears to be an unnecessary burden on the parties involved to implement the parameters and maintain the parameters over time.

C.3.4   Proposed solution

The mobile operator knows both the capability of his network (e.g. Cell-ID + A-GPS) and the capability of the handset being utilized by the E112 caller (e.g. has or does not have A-GPS or EOTD capability).

The proposed solution is therefore that the emergency operator tells the mobile operator what type of fix is required (as in clause 10.1) and the mobile operator maps that request to the operator's appropriate location fix technology with whatever parameters are required for that operator's implementation).

This functionality could be included in the protocol described in the present document by utilizing the LIF optional <loc_type> element and the addition of two new values to the element as follows.

LIF 3.0 possible values	Response Required
<loc_type type='CURRENT' />	Refer to TS 122 071 and TS 129 002 for definition
<loc_type type='LAST' />	Refer to TS 122 071 and TS 129 002 for definition
<loc_type type='CURRENT_OR_LAST' />	Refer to TS 122 071 and TS 129 002 (see bibliography) for definition
<loc_type type='INITIAL' />	Refer to TS 122 071 and TS 129 002 (see bibliography) for definition
Proposed New Additions	
<loc_type type='CURRENT_FAST' />	Fastest possible current location fix is required
<loc_type type='CURRENT_ACCURATE' />	Most accurate current location fix is required

Note that in situations where:

- only Cell-ID implemented;

- or where EOTD or A-GPS is implemented but a fix is not available at the time;

the response to both requests may in fact be the same (e.g. Cell-ID).

The response elements <EllipticalArea> and <lev_conf> will enable the emergency operator to determine the accuracy of the response.

The emergency location immediate request (see clause A.1) would then become (addition in *italics)* as illustrated in the XML example below.

XML Code	Notes
<?xml version="1.0" ?>	
<!DOCTYPE svc_init SYSTEM "MLP_SVC_INIT_300.DTD">	
<svc_init ver="3.0.0">	Service initiation for MLP Version 3.0.0
<hdr ver="3.0.0">	Header for MLP Version 3.0.0
<client>	Who is requesting this location fix
<id>*aaaa….a*</id>	Emergency operator registered user name for login
<pwd>*aaaa…a*</pwd>>	Optional - Emergency operator password for login
</client>	
</hdr>	
<eme_lir ver="3.0.0">	Emergency Location Immediate Request for MLP Version 3.0.0
<msids>	Identifier of device to be located
<msid type="MSISDN">*ccpppppppppppp*</msid>	Identifier is a MSISDN formatted as Country Code + Phone Number (GSM/3GPP should conform to TS 123 003, see bibliography)
</msids>	
<loc_type type='tttt....t' />	*Where "tttt....t" is either "CURRENT_FAST" or "CURRENT_ACCURATE"*
</eme_lir	
</svc_init>	

C.3.5 Proposed action

Propose the addition of the CURRENT_FAST and CURRENT_ACCURATE values to the <loc_type> element within MLP at the LIF meeting in September 2002.

C.4 Proposed additional functionality - HTTP 1.1 pipelining

C.4.1 Background - out of order responses

Another issue with the implementation of more than one location technology by a MNO is that it is possible that the response to one enquiry which utilizes an accurate slow response technology (e.g. A-GPS) may block the response to a subsequent inaccurate quick response technology (e.g. Cell-ID) since the HTTP responses to HTTP request messages must be in the same order as the HTTP requests were received.

MLP 3.2 allows the emergency location immediate request to be specified as asynchronous. This allows responses to be returned when available and consequently not in the order they were received.

Emergency services require the quickest possible response to requests for the location of a caller.

It is therefore proposed that the emergency operator will utilize pipelining as defined the HTTP 1.1 to enable them to submit requests for location sequentially without waiting for a response.

Under HTTP 1.1 responses should be returned in the same order as the requests were received.

C.4.2 Issue

For emergency operators the following use case is unacceptable.

Assume that an operator has implemented both Cell-ID and A-GPS based positioning technologies.

If the emergency operator submits a location request for one MSISDN which causes the network to initiate an A-GPS fix and then immediately follows it with a request for another MSISDN which causes the network to initiate a Cell-ID based fix, then following the HTTP 1.1 standard the operator cannot return the cell-ID based location result until it has returned the A_GPS based location result.

As the A-GPS based fix may take 30 s to 60 s and the Cell-ID based fix may take only 1 s to 2 s the potential delay of 28 s to 59 s in returning the cell-id based result to the emergency operator in unacceptable.

C.4.3 Proposed solution

C.4.3.1 HTTP 1.1 non conformance

Return results to emergency operator from network as each result is available. This implies that the results returned may not be in the same order that the requests were received as required by HTTP 1.1.

C.4.3.2 Utilize a transaction ID

In order that the emergency operator can match potentially out of order responses with the appropriate request a transaction ID needs to be added by the emergency operator to each request and the same transaction ID returned by the operator with each valid response or error response.

Note that because of dropped calls it is possible that the emergency operator may submit a request for an MSISDN before a previous request for the same MSISDN has been responded to. Therefore the MSIDN is not sufficient to match requests and responses.

C.4.4   Proposed action

Add a transaction ID element to MLP.

Add a Life-pulse message sequence to MLP.

C.5   Location report - Network initiated push service

FFS

Annex D (informative):
Bibliography

EPSG guidance notes documentation (see Guidance notes).

ETSI TS 123 003: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Numbering, Addressing and Identification (3GPP TS 23.003)".

ETSI TS 122 071: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Location Services (LCS); Service description, Stage 1 (3GPP TS 22.071)".

ETSI TS 129 002: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile Application Part (MAP) specification (3GPP TS 29.002)".

ETSI EN 300 356 (all parts): "Integrated Services Digital Network (ISDN); Signalling System No. 7 (SS7); ISDN User Part (ISUP) version 4 for the international interface".

W3C rec-xml-19980210: "Extensible Markup Language (XML) 1.0".

   NOTE: Available at http://www.w3c.org

IETF RFC 2616: "Hypertext Transfer Protocol - HTTP/1.1".

   NOTE: Available at http://www.ietf.org

History

Document history		
V1.1.1	April 2003	Publication
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