Next-Generation Pan-European eCall
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Abstract

   This document describes how to use IP-based emergency services
   mechanisms to support the next generation of the Pan European in-
   vehicle emergency call service defined under the eSafety initiative
   of the European Commission (generally referred to as "eCall"). eCall
   is a standardized and mandated system for a special form of emergency
   calls placed by vehicles. eCall deployment is required by 2015 in
   European Union member states, and eCall (and eCall-compatible
   systems) are also being deployed in other regions. eCall provides an
   integrated voice path and a standardized set of vehicle, sensor
   (e.g., crash related), and location data. An eCall is recognized and
   handled as a specialized form of emergency call and is routed to a
   specialized eCall-capable Public Safety Answering Point (PSAP)
   capable of processing the vehicle data and trained in handling
   emergency calls from vehicles.

   Currently, eCall functions over circuit-switched cellular telephony;
   work on next-generation eCall (NG-eCall, sometimes called packet-
   switched eCall or PS-eCall) is now in process, and this document
   assists in that work by describing how to support eCall within the
   IP-based emergency services infrastructure.

   This document also registers a MIME Content Type and an Emergency
   Call Additional Data Block for the eCall vehicle data.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
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material or to cite them other than as "work in progress."

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[1](#). **Terminology**

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in [[RFC2119](#)].

   This document re-uses terminology defined in [Section 3 of [RFC5012]](#).

   Additionally, we use the following abbreviations:

   3GPP: 3rd Generation Partnership Project
   CEN: European Committee for Standardization
   EENA: European Emergency Number Association
   ESInet: Emergency Services IP network
   IMS: Internet Multimedia Subsystem
   IVS: In-Vehicle System
   MNO: Mobile Network Operator
   MSD: Minimum Set of Data

PSAP: Public Safety Answering Point

2. Document Scope

This document is limited to the signaling, data exchange, and
protocol needs of next-generation eCall (NG-eCall, also referred to
as packet-switched eCall (PS-eCall) and all-IP eCall). eCall itself
is specified by 3GPP and CEN and these specifications include far
greater scope than is covered here.

The eCall service operates over cellular wireless communication, but
this document does not address cellular-specific details, nor client
domain selection (e.g., circuit-switched versus packet-switched).
All such aspects are the purview of their respective standards
bodies. The scope of this document is limited to eCall operating
within a SIP-based environment, such as 3GPP IMS Emergency Calling.

Vehicles designed for multiple regions may need to support eCall and
other Advanced Automatic Crash Notification systems, such as
described in [draft-ietf-ecrit-car-crash]. That system is compatible
with eCall in most respects, differing primarily in the Request-URI
and the specific data block that is sent.

3. Introduction

Emergency calls made from vehicles (e.g., in the event of a crash)
assist in significantly reducing road deaths and injuries by allowing
emergency services to be aware of the incident, the state of the
vehicle, the location of the vehicle, and to have a voice channel
with the vehicle occupants. This enables a quick and appropriate
response.

The European Commission initiative of eCall was conceived in the late
1990s, and has evolved to a European Parliament decision requiring
the implementation of compliant in-vehicle systems (IVS) in new
vehicles and the deployment of eCall in the European Member States in
2015. eCall (and eCall-compatible systems) are also being adopted in
other regions.

The pan-European eCall system provides a standardized and mandated
mechanism for emergency calls by vehicles. eCall establishes
procedures for such calls to be placed by in-vehicle systems,
recognized and processed by the network, and routed to a specialized
PSAP where the vehicle data is available to assist the call taker in
assessing and responding to the situation. eCall provides a standard
set of vehicle, sensor (e.g., crash related), and location data.

An eCall may be either user-initiated or automatically triggered.
Automatically triggered eCalls indicate a car crash or some other
serious incident (e.g., a fire) and carry a greater presumption of
risk of injury. Manually triggered eCalls may be reports of serious
hazards and are likely to require a different response than an
automatically triggered eCall. Manually triggered eCalls are also
more likely to be false (e.g., accidental) calls and may thus be
subject to different handling by the PSAP.

Currently, eCall is standardized (by 3GPP [SDO-3GPP] and CEN [CEN])
as a 3GPP circuit-switched call over GSM (2G) or UMTS (3G). Flags in
the call setup mark the call as an eCall, and further indicate if the
call was automatically or manually triggered. The call is routed to
an eCall-capable PSAP, a voice channel is established between the
vehicle and the PSAP, and an eCall in-band modem is used to carry a
defined set of vehicle, sensor (e.g., crash related), and location
data (the Minimum Set of Data or MSD) within the voice channel. The
same in-band mechanism is used for the PSAP to acknowledge successful
receipt of the MSD, and to request the vehicle to send a new MSD
(e.g., to check if the state of or location of the vehicle or its
occupants has changed). Work on next-generation eCall (NG-eCall,
also referred to as packet-switched eCall or PS eCall) is now in
process. As part of this work, the European Telecommunications
Standards Institute (ETSI) [SDO-ETSI] has published a Technical
Report titled "Mobile Standards Group (MSG); eCall for VoIP" [MSG_TR]
that presents findings and recommendations regarding support for
eCall in an all-IP environment. NG-eCall moves from circuit switched
to all-IP, and carries the vehicle data and other eCall-specific data
as additional data associated with the call. This document describes
how IETF mechanisms for IP-based emergency calls, including [RFC6443]
and [additional-data-draft] are used to provide the signaling and
data exchange of the next generation of pan-European eCall.

NG-eCall is a 3GPP IMS emergency call with additional elements
identifying the call as an eCall and as carrying eCall data and with
mechanisms for carrying the data. 3GPP IMS emergency services
support multimedia, providing the ability to carry voice, text, and
video. This capability is referred to within 3GPP as Multimedia
Emergency Services (MMES).

A transition period will exist during which time the various entities
involved in initiating and handling an eCall might support next-
generation eCall, legacy eCall, or both. This transition period
might last several years or longer. The issue of migration/co-
existence during the transition period is very important but is
outside the scope of this document. The ETSI TR "Mobile Standards
Group (MSG); eCall for VoIP" [MSG_TR] discusses these issues in
Clause 7.

4. eCall Requirements

   Overall eCall requirements are specified by by by CEN in [EN 16072]
   and by 3GPP in [TS22.101] clauses 10.7 and A.27. Requirements
   specific to vehicle data are contained in EN 15722 [msd]. For
   convenience, the requirements most applicable to the limited scope of
   this document are summarized very briefly below.

   eCall requires:

   o The call be recognized as an eCall (which is inherently an
      emergency call)
   o The call setup indicates if the call was manually or automatically
      triggered
   o A voice channel between the vehicle and the PSAP
   o Carrying the MSD intrinsically with the call (the MSD needs to be
      available to the same call-taker as the voice)
   o The ability for the PSAP to acknowledge receipt of the MSD
   o The ability for the PSAP to request that the vehicle generate and
      transmit a new MSD
   o The ability of the PSAP to be able to re-contact the occupants of
      vehicle after the initial eCall is concluded
   o The ability to perform a test call (which may be routed to a PSAP
      but is not treated as an emergency call and not handled by a call
      taker)

   It is recognized that NG-eCall offers many potential enhancements,
   although these are not required by current EU regulations. For
   convenience, the enhancements most applicable to the limited scope of
   this document are summarized very briefly below.

   NG-eCall is expected to offer:

   o The ability to carry more data (e.g., an enhanced MSD or an MSD
      plus additional sets of data)
   o The ability to handle video
   o The ability to handle text
   o The ability for the PSAP to access vehicle components (e.g., an
      onboard camera (such as rear facing or blind-spot cameras) for a
      visual assessment of the crash site situation)
   o The ability for the PSAP to request the vehicle to take actions
      (e.g., sound the horn, disable the ignition, lock/unlock doors)
   o The ability to avoid audio muting of the voice channel (because
      the MSD is not transferred using an in-band modem)

5. **Vehicle Data**

   Pan-European eCall provides a standardized and mandated set of
   vehicle related data, known as the Minimum Set of Data (MSD). The
   European Committee for Standardization (CEN) has specified this data
   in EN 15722 [msd], along with both ASN.1 and XML encodings for the
   MSD [msd]. Circuit-switched eCall uses the ASN.1 encoding. The XML
   encoding is better suited for use in SIP messages and is used in this
   document. (The ASN.1 encoding is specified in Annex A of EN 15722
   [msd], while the XML encoding is specified in Annex C.)

   The "Additional Data related to an Emergency Call" document
   [additional-data-draft] establishes a general mechanism for attaching
   blocks of data to a SIP emergency call. This document makes use of
   that mechanism to carry the eCall MSD in a SIP emergency call.

   This document registers the 'application/
   emergencyCallData.eCall.MSD+xml' MIME Content-Type to enable the MSD
   to be carried in SIP. This document also adds the 'eCall.MSD' entry
   to the Emergency Call Additional Data Blocks registry (established by
   [additional-data-draft]) to enable the MSD to be recognized as such
   in a SIP-based eCall emergency call.

6. **Call Setup**

   In circuit-switched eCall, the IVS places a special form of a 112
   emergency call which carries the eCall flag (indicating that the call
   is an eCall and also if the call was manually or automatically
   triggered); the mobile network operator (MNO) recognizes the eCall
   flag and routes the call to an eCall-capable PSAP; vehicle data is
   transmitted to the PSAP via the eCall in-band modem (in the voice
   channel).

```
    ///----\\\      112 voice call with eCall flag      +------+
   ||| IVS  |||-------------------------------------->+ PSAP |
    \\\----///   vehicle data via eCall in-band modem   +------+
```

                   Figure 1: circuit-switched eCall

   An In-Vehicle System (IVS) which supports NG-eCall transmits the MSD
   in accordance with [additional-data-draft] by encoding it as
   specified (per Appendix C of EN 15722 [msd]) and attaching it to an
   INVITE as a MIME body part. The body part is identified by its MIME
   content-type ('application/emergencyCallData.eCall.MSD+xml') in the
   Content-Type header field of the body part. The body part is
   assigned a unique identifier which is listed in a Content-ID header
   field in the body part. The INVITE is marked as containing the MSD

by adding (or appending to) a Call-Info header field at the top level
of the INVITE. This Call-Info header field contains a CID URL
referencing the body part's unique identifier, and a 'purpose'
parameter identifying the data as the eCall MSD per the registry
entry; the 'purpose' parameter's value is 'emergencyCallData.' and
the root of the MIME type (not including the 'emergencyCallData'
prefix and any suffix such as '+xml' (e.g.,
'purpose=emergencyCallData.eCall.MSD').

For NG-eCall, the IVS establishes an emergency call using the 3GPP
IMS solution with a Request-URI indicating an eCall type of emergency
call and with vehicle data attached; the MNO or ESInet recognizes the
eCall URN and routes the call to a NG-eCall capable PSAP; the PSAP
interpets the vehicle data sent with the call and makes it available
to the call taker.

```
  ///----\\\      IMS emergency call with eCall URN    +------+
     IVS     ---------------------------------------->+ PSAP |
  \\\----///    vehicle data included in call setup   +------+
```

                        Figure 2: NG-eCall

This document registers new service URN children within the "sos"
subservice. These URNs provide the mechanism by which an eCall is
identified, and differentiate between manually and automatically
triggered eCalls (which may be subject to different treatment,
depending on policy). The two service URNs are:
urn:service:sos.ecall.automatic and urn:service:sos.ecall.manual

7. Call Routing

The routing rules for eCalls are likely to differ from those of other
emergency calls because eCalls are special types of emergency calls
(with implications for the types of response required) and need to be
handled by specially designated PSAPs. In an environment that uses
ESInets, the originating network passes all types of emergency calls
to an ESInet (which have a request URI containing the "SOS" service
URN). The ESInet is then responsible for routing such calls to the
appropriate PSAP. In an environment without an ESInet, the emergency
services authorities and the originating network jointly determine
how such calls are routed.

7.1. ESInets

This section provides background information on ESInets for
information only.

An Emergency Services IP Network (ESInet) is a network operated by
emergency services authorities. It handles emergency call routing
and processing before delivery to a PSAP. In the NG1-1-2
architecture adopted by EENA, each PSAP is connected to one or more
ESInets. Each originating network is also connected to one or more
ESInets. The ESInets maintain policy-based routing rules which
control the routing and processing of emergency calls. The
centralization of such rules within ESInets provides for a cleaner
separation between the responsibilities of the originating network
and that of the emergency services network, and provides greater
flexibility and control over processing of emergency calls by the
emergency services authorities. This makes it easier to react
quickly to unusual situations that require changes in how emergency
calls are routed or handled (e.g., a natural disaster closes a PSAP),
as well as ease in making long-term changes that affect such routing
(e.g., cooperative agreements to specially handle calls requiring
translation or relay services). ESInets may support the ability to
interwork NG-eCall to legacy eCall to handle eCall-capable PSAPs that
are not IP PSAPs (similarly to the ability to interwork IP emergency
calls to legacy non-IP PSAPs). Note that in order to support legacy
eCall-capable PSAPs that are not IP PSAPs and are not attached to an
ESInet, an originating network may need the ability to route an eCall
itself (e.g., to an interworking facility with interconnection to a
suitable legacy eCall capable PSAP) based on the eCall and manual or
automatic indications. The ETSI TR "Mobile Standards Group (MSG);
eCall for VoIP" [MSG_TR] discusses transition issues in Clause 7.

8. Test Calls

eCall requires the ability to place test calls. These are calls that
are recognized and treated to some extent as eCalls but are not given
emergency call treatment and are not handled by call takers. The
test call facility allows the IVS or user to verify that an eCall can
be successfully established with voice communication. The IVS can
also verify that the MSD was successfully received.

A service URN starting with "test." indicates a test call. For
eCall, "urn:service:test.sos.ecall" indicates such a test feature.
This functionality is defined in [RFC6881].

This document registers "urn:service:test.sos.ecall" for eCall test
calls.

the current eCall test call facility is a non-emergency number so
does not get treated as an emergency call. MNOs may treat a vehicle
call in the "test" service URN in a way that tests as much
functionality as desired, but this is outside the scope of this
document.

PSAPs that have the ability to process NG-eCalls SHOULD accept test
calls and send an acknowledgment if the MSD was successfully
received, per this document. Such PSAPs MAY also play an audio clip
(for example, saying that the call reached a PSAP) in addition to
supporting media loopback per [RFC6881].

9. eCall-Specific Control/Metadata

eCall requires the ability for the PSAP to acknowledge successful
receipt of an MSD sent by the IVS, and for the PSAP to request that
the IVS send an MSD (e.g., the call taker may initiate a request for
a new MSD to see if the vehicle's state or location has changed).
Future enhancements are desired to enable the PSAP to send other
requests to the vehicle, such as locking or unlocking doors, sounding
the horn, flashing the lights, starting a video stream from on-board
cameras (such as rear focus or blind-spot), etc.

The mechanism established in [additional-data-draft], used in
Section 5 of this document to carry the MSD from the IVS to the PSAP,
is also used to carry a block of control data from the PSAP to the
IVS. This eCall control block (sometimes referred to as eCall
metadata) is an XML structure containing eCall-specific elements.
When the PSAP needs to send an eCall control block that is in
response to the MSD or other data sent by the IVS in a SIP request,
the control block can be sent in the SIP response to that request
(e.g., the INVITE). When the PSAP needs to send an eCall control
block that is not an immediate response to an MSD or other data sent
by the IVS, the control block can be transmitted from the PSAP to the
IVS in a SIP INFO message within the established session. The IVS
can then send any requested data (such as a new MSD) in the reply to
the INFO message. This mechanism flexibly allows the PSAP to send
eCall-specific data to the IVS and the IVS to respond. If control
data sent in a response message requests the IVS to send a new MSD or
other data block, the IVS can do so in an INFO message within the
session (it could also use re-INVITE but that is unnecessary when no
aspect of the session or media is changing).

This mechanism requires

o An XML definition of the eCall control object
o An extension mechanism by which new elements can be added to the
   control object definition (e.g., permitting additional elements to
   be included by adding their namespace)
o A MIME type registration for the control object (so it can be
   carried in SIP messages and responses)
o An entry in the Emergency Call Additional Data Blocks sub-registry
   (established by [additional-data-draft]) so that the control block

can be recognized as emergency call specific data within the SIP
messages
o An Info-Package registration per [RFC6086] permitting the control
block within Info messages

9.1. The eCall Control Block

The eCall control block is an XML data structure allowing for
acknowledgments, requests, and capabilities information. It is
carried in a SIP body part with a specific MIME content type. Three
top-level elements are defined for use within an eCall control block:

ack   Used in a control block sent by either side. The PSAP
              uses this to acknowledge receipt of data set sent by
              the IVS. The IVS uses this to acknowledge receipt of a
              request by the PSAP when that request would not
              otherwise be acknowledged (if the PSAP requests the
              vehicle to send data and the vehicle does so, the data
              serves as a success acknowledgement).

capabilities: Used in a control block sent from the IVS to the PSAP
              (in the initial INVITE or subsequently if desired) to
              inform the PSAP of the vehicle capabilities. Child
              elements contain all actions and data types supported
              by the vehicle .

request   Used in a control block sent by the PSAP to the IVS, to
              request the vehicle to perform an action.

Mandatory Actions (the IVS MUST support):

o Transmit data object

Optional Actions (the IVS MAY support):

o Play and/or display static (pre-defined) message
o Speak/display dynamic text (text supplied in action)
o Play dynamic audio (media supplied in SIP body part or in action)
o Flash lights, honk horn

The 'ack' element indicates the object being acknowledged, and
reports success or failure.

The 'capabilities' element has child 'request' elements to indicate
the actions supported by the IVS.

The 'request' element contains attributes to indicate the request and
to supply any needed information and MAY contain child elements

'text' and 'media' to contain the text or media for a dynamic
message. The 'action' attribute is mandatory and indicates the
specific action. An IANA registry is established by this document in
Section 13.8.1 to contain the allowed values.

New elements, child elements, and attributes can be defined with
their own sub-namespaces. IANA registries are used to specify the
permitted values of several elements and attributes. These
mechanisms allow for extension.

9.1.1. The 'ack' Element

The 'ack' element is transmitted by the PSAP to acknowledge receipt
of an eCall data object. An 'ack' element sent by a PSAP references
the unique ID of the data object that was sent by the IVS, and
further indicates if the PSAP considers the receipt successful or
not. The 'ack' element is also transmitted by the IVS to the PSAP to
acknowledge receipt of a 'request' element that requested the IVS to
perform an action other than transmitting a data object (e.g., a
request to display a message would be acknowledged, but a request to
transmit a data object would not result in a separate 'ack' element
being sent, since the data object itself serves as acknowledgment.)
An 'ack' element sent by an IVS references the unique ID of the
request being acknowledged, and further indicates whether the request
was successfully performed.

The 'ack' element has the following attributes and child elements:

9.1.1.1. Attributes of the 'ack' Element

The 'ack' element has the following attributes:

Name: ref
Usage: Mandatory
Type: anyURI
Description: References the Content-ID of the body part that
   contained the data object or control object being acknowledged.
Example: <ack received="yes" ref="1234567890@atlanta.example.com"/>

Name: rec
Usage: Mandatory
Type: Boolean
Description: Indicates if the referenced object was successfully
   received or not.
Example: <ack received="yes" ref="1234567890@atlanta.example.com"/>

9.1.1.2. **Child Elements of the 'ack' Element**

   The 'ack' element has the following child elements:

   Name: ActionResult
   Usage: Optional
   Description: An 'ActionResult' element indicates the result of an
      action (other than a 'send-data' action). It has the following
      attributes:

      Name: action
      Usage: Mandatory
      Type: token
      Description: Contains the value of the 'action' attribute of the
         'request' element

      Name: success
      Usage: Mandatory
      Type: Boolean
      Description: Indicates if the action was successfully
         accomplished

      Name: reason
      Usage: Conditional
      Type: token
      Description: Used when 'success' is "False", this attribute
         contains a reason code for a failure. A registry for reason
         codes is defined in Section 13.8.3.

      Name: details
      Usage: optional
      Type: string
      Description: Contains further explanation of the circumstances of
         a success or failure. The contents are implementation-specific
         and human-readable.

   Example: <ActionResult action="msg-dynamic" success="true"/>

   Example: <ActionResult action="lamp" success="false" reason="unable"
      details="The requested lamp is inoperable"/>

9.1.2. **The 'capabilities' Element**

   The 'capabilities' element is transmitted by the IVS to indicate to
   the PSAP its capabilities. No attributes are currently defined. The
   following child elements may be used:

9.1.2.1. **Child Elements of the 'capabilities' Element**

   The 'capabilities' element has the following child elements:

   Name: request
   Usage: Mandatory
   Description: The 'capabilities' element contains a <request> child
      element per action supported by the vehicle. Because support for
      a 'send-data' action is REQUIRED, a <request> child element with a
      "send-data" 'action' attribute is also REQUIRED. The 'supported-
      datatype' attribute is REQUIRED in this <request> element and MUST
      contain all eCall data blocks supported by the IVS. Currently,
      only the 'eCall.MSD' datatype is defined. All other actions are
      OPTIONAL. If the "play-audio" action is supported, a <request>
      child element with a "play-audio" 'action' attribute is sent, with
      a 'supported-mime' attribute set to all MIME content types
      supported by the vehicle. If the "msg-static" action is
      supported, a <request> child element with a "msg-static" 'action'
      attribute is sent, with a 'msgid' attribute set to the highest
      supported static message supported by the vehicle.
   Examples: <request action="play-audio" supported-mime="audio/3gpp;
      audio/3gpp2; audio/amr; audio/evrc"/>
      <request action="send-data" supported-datatype="eCall.MSD" />
      <request action="send-data" supported-datatype="eCall.MSD; VEDS;
      eCall.type2" />
      <request action="msg-dynamic"/>
      <request action="msg.static" msgid="17" />

9.1.3. **The 'request' Element**

   A 'request' element appears one or more times on its own or as a
   child of a 'capabilities' element. The following attributes and
   child elements may be used:

9.1.3.1. **Attributes of the 'request' Element**

   The 'request' element has the following attributes:

   Name: action
   Usage: Mandatory
   Type: token
   Description: Identifies the action that the vehicle is requested to
      perform. An IANA registry is established in Section 13.8.1 to
      contain the allowed values.
   Example: action="send-data"

   Name: msgid
   Usage: Conditional

   Type: int
   Description: Mandatory with a "msg-static" action. Indicates the
      identifier of the static message to be displayed and/or spoken for
      the vehicle occupants. This document established an IANA registry
      for messages and their IDs, in [Section 13.8.2](#)
   Example: msgid="3"

   Name: persistance
   Usage: Optional
   Type: duration
   Description: Specifies how long to carry on the specified action,
      for example, how long to continue honking or flashing. If absent,
      the default is indefinitely.
   Example: persistance="PT1H"

   Name: datatype
   Usage: Conditional
   Type: token
   Description: Mandatory with a "send-data" action. Specifies the
      data block that the IVS is requested to transmit, using the same
      identifier as in the 'purpose' attribute set in a Call-Info header
      field to point to the data block. Permitted values are contained
      in the 'Emergency Call Data Types' IANA registry established in
      [[additional-data-draft](#)].
   Example: datatype="eCall.MSD"

   Name: ref
   Usage: Conditional
   Type: URI
   Description: Mandatory with a "play-audio" action. References the
      audio media to be played. A CID is used to reference an audio
      body part contained in the same SIP message. An external URL
      (e.g., HTTP) is used to reference external content. Note that
      external references might not be accessible by the vehicle due to
      a variety of transient or permanent conditions.
   Example: ref="cid:5432154321@example.gov"

   Name: supported-mime
   Usage: Conditional
   Type: token
   Description: Used with a 'play-audio' action in a 'request' element
      that is a child of a 'capability' element, this attribute lists
      all MIME content types/subtypes that the vehicle can render.
      Multiple values are separated with a semicolon.
   Example: supported-mime="audio/3gpp; audio/3gpp2; audio/amr; audio/
      evrc"

   Name: supported-datatype

   Usage: Conditional
   Type: token
   Description: Used with a 'send-data' action in a 'request' element
      that is a child of a 'capability' element, this attribute lists
      all data blocks that the vehicle can transmit, using the same
      identifier as in the 'purpose' attribute in a Call-Info header
      field to point to the data block. Permitted values are contained
      in the 'Emergency Call Data Types' IANA registry established in
      [additional-data-draft]. Multiple values are separated with a
      semicolon.
   Example: supported-datatype="eCall.MSD; VEDS; eCall.foo"

   Name: lamp-ID
   Usage: Conditional
   Type: token
   Description: Used with a 'lamp' action, indicates which lamps the
      action affects. This document creates a registry of lamp-ID
      tokens, in Section 13.8.4
   Example: lamp-ID="hazard"

   Name: lamp-action
   Usage: Conditional
   Type: enumeration
   Description: Used with a 'lamp' action, indicates if the lamp should
      be illuminated, turned off, or flashed. Permitted values are
      'on', 'off', and 'flash'.
   Example: lamp-action="flash"

9.1.3.2. Child Elements of the 'request' Element

   The 'request' element has the following child elements:

   Name: text
   Usage: Conditional
   Type: string
   Description: Used within a <request action="msg-dynamic"> element to
      contain the text to be displayed and/or spoken (via text-to-
      speech) for the vehicle occupants.
   Example: <text>Emergency authorities are aware of your incident and
      location. Due to a multi-vehicle incident in your area, no one is
      able to speak with you right now. Please remain calm. We will
      assist you soon.</text>

   Name: media
   Usage: Optional
   Type: base64Binary
   Attribute: xmime:contentType (mandatory; contains the MIME content
      type of the media)

Description: MAY be used within a <request action="play-dynamic">
   element to contain the media to be rendered for the vehicle
   occupants. (The media may also be located in its own body part
   and referenced by a CID URL, or may be external and referenced
   with an external URL.)

Example: <media>Rk9STQAABeZBSUZGQ09NTQAAABIAAgAAAW4AEEANrEQAAAAAAABT
   U05EAAAFwAAA

AAAAAAAAAAAAABHqEeoiISIhL1ovWjiPOI89Gz0bPK48rjdmN2YtxC3EIJ0gnRET
ERMAagBq7/3v/eEd4R3U7dTtzGTMZMghyCHIaMhozSPNI9XY1djh0uHS8ALwAv88
/zwOSQ5JG/Yb9icwJzAvFC8UMxkzGTLxMvEuuS65JtEm0RvtG+0O/g7+AQoBCvND
80PmtOa03F3cXdUL1QvRR9FH0VbRVtUa1RrcQ9xD5ifmJ/H48fj+uv66C10LXRbi
FuIgayBrJzAnMCq4KrgqwirCJ2MnYyDpIOkX5hfmDSENIQF4AXj15fXl60zrTOKG
4obcQ9xD2PPY89jV2NXb1dvV4bThtOno6ejzvPO8/mT+ZAj9CP0SuRK5Gs4aziCY
IJgjsyOzI+Uj5SE0ITQb4xvjFHMUcwt1C3UBugG6+AT4BO8Q7xDnoeeh4kXiRd9e
317fId8h4YbhhuZU5lTtGu0a9Un1Sf4y/jIHGwcbD08PTxYnFicbHxsfHdUd1R4a
Hhob+xv7F6EXoRF4EXgKAgoCAdgB2Pmz+bPyK/Ir697r3udG50bkvuS+5G3kbeZP
5k/qQepB79rv2vap9qn+Hv4eBZIFkgyADIASTxJPFowWjBjsGOwZQhlCF5IXkhQE
FAQO6g7qCLcItwHnAef7DvsO9Lf0t+9c71zrb+tv6TfpN+jd6N3qX+pf7ZPtk/I6
8jr34Pfg/h7+HgRgBGAKNAo0Dx0PHRK+Er4U0hTSFTIVMhPcE9wQ9RD1DL0MvQeT
B5MB4gHi/Cj8KPbL9svyRPJE7uju6Oz87Pzsl+yX7crtyvBn8Gf0P/Q/+PT49P4o
/igDZQNlCE0ITQx7DHsPlA+UEWQRZBHCEcIQuBC4DlgOWArfCt8GkwaTAc4Bzv0E
/QT4gfiB9Kj0qPHL8cvwIPAg77vvu/Cn8Kfyy/LL9fn1+fnh+eH+PP48AqICogbG
BsYKTQpNDPQM9A6BDoEO5Q7lDhIOEgwmDCYJRAlEBbEFsQG6Abr9r/2v+eb55vap
9qn0NfQ18rvyu/Jd8l3zFvMW9NX01fdx93H6tPq0/lX+VQIFAgUFfgV+CH8IfwrB
CsEMGwwbDHsMewvaC9oKQwpDB+MH4wTtBO0BnAGc/jz+PPsI+wj4SvhK9jX2NfTu
9O70lfSV9SH1IfaQ9pD4ufi5+237bf5z/nMBiAGIBHoEegcCBwII7gjuChsKGwp2
CnYJ+An4CK0IrQa7BrsEQgRCAX0Bff6r/qv7+vv6+aT5pPfg9+D2xvbG9m32bfba
9tr4BPgE+cz5zPwJ/An+kv6SASgBKAOhA6EFxQXFB2oHaghwCHAIwQjBCGEIYQdW
B1YFuwW7A6sDqwFfAV/+//7//L/8v/rD+sP5P/k/+E/4T/f59/n4T/hP+T/5P/q5
+rn8lvyW/rX+tQDeAN4C8gLyBMAEwAYkBiQHBwcHB1YHVYgcMBwwGNAY0BN4E3gMt
Ay0BPAE8/0H/Qf1Z/Vn7tPu0+mn6afmV+ZX5SvlK+Yv5i/pK+kr7gfuB/Q79Dv7T
/tMAoQChAmACYAPoA+gFGwUbBd4F3gYkBiQF7QXtBT0FPQQQkBCQCuwK7AR4BHv94
/3j93P3c/HP8c/tZ+1n6pfql+mT6ZPqR+pH7Mfsx/C38Lf14/Xj+8f7xAHQAdAHs
AewDNwM3BDgEOATjBOMFJQUlBP0E/QRwBHADgwODAlsCWwwEBAQH/oP+g/kb+Rv0Y
/Rj8KPwo+4v7i/tK+0r7bftt+/D78zE/MT90v3S/wn/CQBRAFEBjQGNAqcCpwODOD
A4MEFQQVBEwETAQuBC4DugO6AwEDAQIFAgUA6ADo/7//v/6c/pz9m/2b/M78zvxL
/Ev8DvwO/Cj8KPyR/JH9O/07/iP+I/8n/ycAMgAyATwBPAIuAi4C6ALoA2UDZQOc
A5wDgwODAygDKAKAKNAo0BugG6AM4Azv/Y/9j+4v7i
   A5wDgwODAygDKAKNAo0BugG6AM4Azv/Y/9j+4v7i</media>

9.2. The emergencyCallData.eCall INFO package

This document registers the 'emergencyCallData.eCall' INFO package.
Both endpoints (the IVS and the PSAP equipment) set the Recv-Info
header field to 'emergencyCallData.eCall' per [RFC6086] to indicate
ability to receive INFO messages carrying eCall data or control
blocks.

Support for the 'emergencyCallData.eCall' INFO package indicates the
ability to receive eCall data and control blocks, which are carried
in a body part whose subtype starts with 'emergencyCallData.eCall.'.
At present there is only one defined eCall data block, which has the
'application/emergencyCallData.eCall.MSD+xml' MIME type, and one
eCall control block, which has the 'application/
emergencyCallData.eCall.control+xml' MIME type. The eCall control
block includes the ability for the IVS to indicate its capabilities,
so in the event additional eCall blocks are defined, the IVS can
indicate which it supports.

The use of INFO is based on an analysis of the requirements against
the intent and effects of INFO versus other approaches (such as SIP
MESSAGE, media plane, or non-SIP protocols). In particular, the
transport of eCall data and control blocks is done only during an
emergency session established with SIP, using the mechanism
established in [additional-data-draft], and is normally carried in
the initial INVITE and its response; the use of INFO only occurs when
a data block or request needs to be sent subsequently during the
call. While MESSAGE could be used, it is not tied to a SIP session
as is INFO. REINVITE could also be used, but is normally used to
modify the session. SUBSCRIBE/NOTIFY could be coerced into service,
but the semantics are not a clean fit. Hence, INFO is appropriate.

An INFO request message carrying an eCall data or control block has
an Info-Package header field set to 'emergencyCallData.eCall' per
[RFC6086]. The INFO request message is marked as containing the
eCall data or control block by a Call-Info header field containing a
CID URL referencing the unique identifier of the body part containing
the eCall data or control, and a 'purpose' parameter identifying the
block. Because the eCall data or control block is being carried in
an INFO request message, the body part also carries a Content-
Disposition header field set to "Info-Package".

Per [additional-data-draft], emergency call related additional data
MAY be included in any SIP message. Hence, notwithstanding
Section 4.3.2. of [RFC6086], INFO response messages MAY contain eCall
data or control blocks, provided they are included as described in
this document (with a Call-Info header field containing a CID URL
referencing the unique identifier of the body part, and a 'purpose'
parameter identifying the block). When eCall data or control blocks
are included in an INFO response message, this is done per
[additional-data-draft] and this document, and not under [RFC6086];
that is, they are included as emergency call additional data, not as
an INFO package associated data.

10. Examples

   Figure 3 shows an eCall. The call uses the request URI
   'urn:service:sos.ecall.automatic' service URN and is recognized as an
   eCall, and further as one that was invoked automatically by the IVS
   due to a crash or other serious incident. In this example, the
   originating network routes the call to an ESInet (as for any
   emergency call in an environment with an ESInet). The ESInet routes
   the call to the appropriate NG-eCall capable PSAP. The emergency
   call is received by the ESInet's Emergency Services Routing Proxy
   (ESRP), as the entry point into the ESInet. The ESRP routes the call
   to a PSAP, where it is received by a call taker. In deployments
   where there is no ESInet, the originating network routes the call
   directly to the appropriate NG-eCall capable PSAP.

```
             +------------+  +-------------------------------------+
             |            |  |            +-------+                |
             |            |  |            | PSAP2 |                |
             |            |  |            +-------+                |
             |            |  |                                     |
             |            |  |  +------+     +-------+             |
   Vehicle-->|            |--+->| ESRP |---->| PSAP1 |--> Call-Taker |
             |            |  |  +------+     +-------+             |
             |            |  |                                     |
             |            |  |            +-------+                |
             |            |  |            | PSAP3 |                |
             | Originating|  |            +-------+                |
             |   Mobile   |  |                                     |
             |  Network   |  |            ESInet                   |
             +------------+  +-------------------------------------+
```
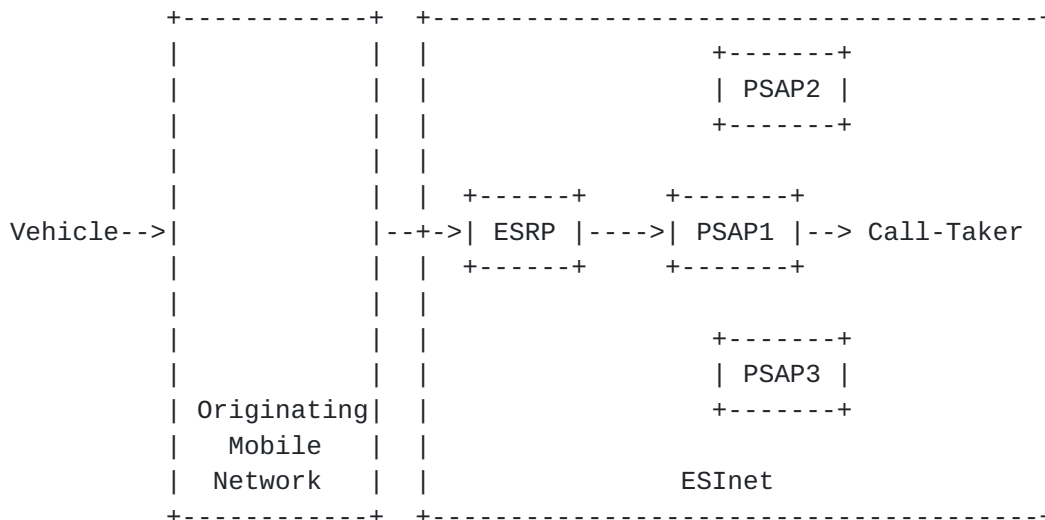
                 Figure 3: Example of NG-eCall Message Flow

   The example, shown in Figure 4, illustrates a SIP eCall INVITE that
   contains an MSD.

```
      INVITE urn:service:sos.ecall.automatic SIP/2.0
      To: urn:service:sos.ecall.automatic
      From: <sip:+13145551111@example.com>;tag=9fxced76sl
      Call-ID: 3848276298220188511@atlanta.example.com
      Geolocation: <cid:target123@example.com>
      Geolocation-Routing: no
      Call-Info: cid:1234567890@atlanta.example.com;
                  purpose=emergencyCallData.eCall.MSD
      Accept: application/sdp, application/pidf+xml
      CSeq: 31862 INVITE
      Recv-Info: emergencyCallData.eCall
      Content-Type: multipart/mixed; boundary=boundary1
      Content-Length: ...

      --boundary1

      Content-Type: application/sdp

      ...Session Description Protocol (SDP) goes here

      --boundary1

      Content-Type: application/emergencyCallData.eCall.MSD+xml
      Content-ID: 1234567890@atlanta.example.com

      ...eCall MSD data object goes here

       --boundary1--
```

                       Figure 4: SIP NG-eCall INVITE

11. Security Considerations

   The security considerations described in [RFC5069] apply here.

   An eCall will carry two forms of location data: the network-provided
   location that is inherently part of IMS emergency calls (which might
   be determined solely by the network, or in cooperation with or
   possibly entirely by the originating device), and the IVS-supplied
   location within the MSD. This is likely to be useful to the PSAP,
   especially when the two locations are independently determined. Even
   in situations where the network-supplied location is limited to the
   cell site, this can be useful as a sanity check on the device-
   supplied location contained in the MSD.

   The document [I-D.ietf-ecrit-trustworthy-location] discusses trust
   issues regarding location provided by or determined in cooperation
   with end devices.

The mechanism by which the PSAP sends acknowledgments and requests to
the vehicle requires authenticity considerations; when the PSAP
request is received within a session initiated by the vehicle as an
eCall emergency call placed over a cellular network, there is a
higher degree of trust that the source is indeed a PSAP. If the PSAP
request is received in other situations, such as a call-back, the
trust issues in verifying that a call-back is indeed from a PSAP are
more complex (see the PSAP Callback document [RFC7090]). A further
safeguard (applicable regardless of which end initiated the call and
the means of the call) is for the PSAP or emergency service provider
to sign the body part using a certificate issued by a known emergency
services certificate authority and for which the IVS can verify the
root certificate.

12. XML Schema

This section defines the XML schema of the eCall control block.

```
<?xml version="1.0" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns:tns="http://example.com/ct-required"
           xmlns:xmime="http://www.w3.org/2005/05/xmlmime"
           targetNamespace="http://example.com/ct-required">

    <xs:import namespace="http://www.w3.org/2005/05/xmlmime"
           schemaLocation="http://www.w3.org/2005/05/xmlmime"/>

    <!-- This element has binary content and requires the
         xmime:contentType attribute which indicates the
         content-type of the binary element -->
    <xs:element name="media">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="xs:base64Binary" >
            <xs:attribute ref="xmime:contentType"
                use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>

</xs:schema>
```

Figure 5: eCall Control Block Schema

13. IANA Considerations

13.1. Service URN Registrations

   IANA is requested to register the URN 'urn:service:sos.ecall' under
   the sub-services 'sos' registry defined in Section 4.2 of [RFC5031].

   This service identifies a type of emergency call (placed by a
   specialized in-vehicle system and a carrying standardized set of data
   related to the vehicle and crash or incident, and is needed to direct
   the call to a specialized public safety answering point (PSAP) with
   technical and operational capabilities to handle such calls. Two
   sub-services are registered as well, namely

   urn:service:sos.ecall.manual

      This service URN indicates that an eCall had been triggered based
      on the manual interaction of the driver or a passenger.

   urn:service:sos.ecall.automatic

      This service URN indicates that an eCall had been triggered
      automatically, for example, due to a crash or other serious
      incident (e.g., fire).

   IANA is also requested to register the URN
   'urn:service:test.sos.ecall' under the sub-service 'test' registry
   defined in Setcion 17.2 of [RFC6881].

13.2. MIME Content-type Registration for 'application/
       emergencyCallData.eCall.MSD+xml'

   IANA is requested to add application/emergencyCallData.eCall.MSD+xml
   as a MIME content type, with a reference to this document, in
   accordance to the procedures of RFC 6838 [RFC6838] and guidelines in
   RFC 7303 [RFC7303].

      MIME media type name: application

      MIME subtype name: emergencyCallData.eCall.MSD+xml

      Mandatory parameters: none

      Optional parameters: charset

      Indicates the character encoding of the XML content.

Encoding considerations: Uses XML, which can employ 8-bit
characters, depending on the character encoding used. See
Section 3.2 of RFC 7303 [RFC7303].

Security considerations: This content type is designed to carry
vehicle and incident-related data during an emergency call. This
data contains personal information including vehicle VIN,
location, direction, etc. Appropriate precautions need to be
taken to limit unauthorized access, inappropriate disclosure to
third parties, and eavesdropping of this information. In general,
it is permissible for the data to be unprotected while briefly in
transit within the Mobile Network Operator (MNO); the MNO is
trusted to not permit the data to be accessed by third parties.
Sections 7 and Section 8 of [I-D.ietf-ecrit-additional-data]
contain more discussion.

Interoperability considerations: None

Published specification: Annex C of EN 15722 [msd]

Applications which use this media type: Pan-European eCall
compliant systems

Additional information: None

Magic Number: None

File Extension: .xml

Macintosh file type code: 'TEXT'

Person and email address for further information: Hannes
Tschofenig, Hannes.Tschofenig@gmx.net

Intended usage: LIMITED USE

Author: This specification was produced by the European Committee
For Standardization (CEN). For contact information, please see
<http://www.cen.eu/cen/Pages/contactus.aspx>.

Change controller: The European Committee For Standardization
(CEN)

13.3. MIME Content-type Registration for 'application/
       emergencyCallData.eCall.control+xml'

   IANA is requested to add application/
   emergencyCallData.eCall.control+xml as a MIME content type, with a
   reference to this document, in accordance to the procedures of RFC
   6838 [RFC6838] and guidelines in RFC 7303 [RFC7303].

      MIME media type name: application

      MIME subtype name: emergencyCallData.eCall.control+xml

      Mandatory parameters: none

      Optional parameters: charset

      Indicates the character encoding of the XML content.

      Encoding considerations: Uses XML, which can employ 8-bit
      characters, depending on the character encoding used. See
      Section 3.2 of RFC 7303 [RFC7303].

      Security considerations: This content type carries metadata and
      control information and requests, primarily from a Public Safety
      Answering Point (PSAP) to an In-Vehicle System (IVS) during an
      emergency call, and also capabilities from the IVS to the PSAP.
      Metadata (such as an acknowledgment that data sent by the IVS to
      the PSAP was successfully received) has limited privacy and
      security implications. Control information (such as requests from
      the PSAP that the vehicle perform an action) has some privacy and
      important security implications. The privacy concern arises from
      the ability to request the vehicle to transmit a data set, which
      as described in Section 13.2, may contain personal information.
      The security implication is the ability to request the vehicle to
      perform an action. It is important that control information
      originate only from a PSAP or other emergency services provider,
      and not from an impostor. The first safeguard for this is the
      security of the cellular network over which the emergency call was
      placed. In particular, when the IVS initiates an eCall over a
      cellular network, the MNO routes the call to a PSAP. (Calls
      placed using other means, such as Wi-Fi or over-the-top services,
      do not carry the same degree of trust.) Calls received by the
      IVS, such as a call-back from a PSAP, also do not carry the same
      degree of trust, since the current mechanisms are not ideal for
      verifying that such a call is indeed from a PSAP in response to an
      emergency call placed by the IVS. See the discussion in
      Section 11 and the PSAP Callback document [RFC7090]. A further
      safeguard, and one applicable regardless of which end initiated

the call and the means of the call, is for the PSAP or emergency
service provider to sign the body part using a certificate issued
by a known emergency services certificate authority and for which
the IVS can verify the root certificate. Sections [7](#) and Section 8
of [[I-D.ietf-ecrit-additional-data](#)] contain more discussion.

Interoperability considerations: None

Published specification: Annex C of EN 15722 [[msd](#)]

Applications which use this media type: Pan-European eCall
compliant systems

Additional information: None

Magic Number: None

File Extension: .xml

Macintosh file type code: 'TEXT'

Person and email address for further information: Randall Gellens,
rg+ietf@qti.qualcomm.com

Intended usage: LIMITED USE

Author: The IETF ECRIT WG.

Change controller: The IETF ECRIT WG.

[13.4](#). Registration of the 'eCall.MSD' entry in the Emergency Call Additional Data Blocks registry

This specification requests IANA to add the 'eCall.MSD' entry to the
Emergency Call Additional Data Blocks registry (established by
[[additional-data-draft](#)]), with a reference to this document.

[13.5](#). Registration of the 'eCall.control' entry in the Emergency Call Additional Data Blocks registry

This specification requests IANA to add the 'eCall.control' entry to
the Emergency Call Additional Data Blocks registry (established by
[[additional-data-draft](#)]), with a reference to this document.

13.6. **Registration of the emergencyCallData.eCall Info Package**

   IANA is requested to add emergencyCallData.eCall to the Info Packages
   Registry under "Session Initiation Protocol (SIP) Parameters", with a
   reference to this document.

13.7. **URN Sub-Namespace Registration**

13.7.1. **Registration for urn:ietf:params:xml:ns:eCall**

   This section registers a new XML namespace, as per the guidelines in
   RFC 3688 [RFC3688].

   URI: urn:ietf:params:xml:ns:eCall

   Registrant Contact: IETF, ECRIT working group, <ecrit@ietf.org>, as
      delegated by the IESG <iesg@ietf.org>.

   XML:

```
   BEGIN
   <?xml version="1.0"?>
   <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
    "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml">
   <head>
    <meta http-equiv="content-type"
         content="text/html;charset=iso-8859-1"/>
    <title>Namespace for eCall Data</title>
   </head>
   <body>
    <h1>Namespace for eCall Data
       </h1>
   <p>See [TBD: This document].</p>
   </body>
   </html>
   END
```

13.7.2. **Registration for urn:ietf:params:xml:ns:eCall:control**

   This section registers a new XML namespace, as per the guidelines in
   RFC 3688 [RFC3688].

   URI: urn:ietf:params:xml:ns:eCall:control

Registrant Contact: IETF, ECRIT working group, <ecrit@ietf.org>, as
   delegated by the IESG <iesg@ietf.org>.

XML:

    BEGIN
    <?xml version="1.0"?>
    <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
      "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
    <html xmlns="http://www.w3.org/1999/xhtml">
    <head>
      <meta http-equiv="content-type"
            content="text/html;charset=iso-8859-1"/>
      <title>Namespace for eCall Data:
             Control Block</title>
    </head>
    <body>
      <h1>Namespace for eCall Data
          </h1>
      <h2>Control Block</h2>
    <p>See [TBD: This document].</p>
    </body>
    </html>
    END

13.8. Registry creation

This document creates a new registry called 'eCall Control Data'.
The following sub-registries are created for this registry.

13.8.1. eCall Control Action Registry

This document creates a new sub-registry called "eCall Control Action
Registry". As defined in [RFC5226], this registry operates under
"Expert Review" rules. The expert should determine that the proposed
action is within the purview of a vehicle, is sufficiently
distinguishable from other actions, and the actions is clearly and
fully described. In most cases, a published and stable document is
referenced for the description of the action.

The content of this registry includes:

Name: The identifier to be used in the 'action' attribute of an
   eCall control 'request' element.

Description: A description of the action. In most cases this will
   be a reference to a published and stable document. The
   description MUST specify if any attributes or child elements are
   optional or mandatory, and describe the action to be taken by the
   vehicle.

The initial set of values is listed in Table 1.

```
         +-------------+------------------------------+
         |    Name     |         Description          |
         +-------------+------------------------------+
         |  send-data  | Section xxx of this document |
         |             |                              |
         |  msg-static | Section xxx of this document |
         |             |                              |
         | msg-dynamic | Section xxx of this document |
         |             |                              |
         |  play-audio | Section xxx of this document |
         |             |                              |
         |      honk   | Section xxx of this document |
         |             |                              |
         |      lamp   | Section xxx of this document |
         +-------------+------------------------------+
```

Table 1: eCall Control Action Registry Initial Values

13.8.2. eCall Static Message Registry

This document creates a new sub-registry called "eCall Static Message
Registry". Because all compliant vehicles are expected to support
all static messages translated into all languages supported by the
vehicle, it is important to limit the number of such messages. As
defined in [RFC5226], this registry operates under "Publication
Required" rules, which require a stable, public document and imply
expert review of the publication. The expert should determine that
the document has been published by an appropriate emergency services
organization (e.g., NENA, EENA, APCO) and that the proposed message
is sufficiently distinguishable from other messages.

The content of this registry includes:

ID: An integer identifier to be used in the 'msgid' attribute of an
   eCall control 'request' element.

Message: The text of the message. Messages are listed in the
   registry in English; vehicles are expected to implement
   translations into languages supported by the vehicle.

When new messages are added to the registry, the message text is
determined by the registrant; IANA assigns the IDs. Each message is
assigned a consecutive integer value as its ID. This allows an IVS
to indicate by a single integer value that it supports all messages
with that value or lower.

The initial set of values is listed in Table 2.

```
+----+---------------------------------------------------------------+
| ID |                         Message                               |
+----+---------------------------------------------------------------+
| 1  |      Emergency authorities are aware of your incident and     |
|    |  location.  No one is free to speak with you right now.  We   |
|    |                  will help you as soon as possible.           |
+----+---------------------------------------------------------------+
```

                    Table 2: eCall Static Message Registry

13.8.3. eCall Reason Registry

This document creates a new sub-registry called "eCall Reason
Registry" which contains values for the 'reason' attribute of the
'ActionResult' element. As defined in [RFC5226], this registry
operates under "Expert Review" rules. The expert should determine
that the proposed reason is sufficiently distinguishable from other
reasons and that the proposed description is understandable and
correctly worded.

The content of this registry includes:

ID: A short string identifying the reason, for use in the 'reason'
   attribute of an 'ActionResult' element.

Description: A description of the reason.

The initial set of values is listed in Table 3.

```
+------------------+----------------------------------------------+
|       ID         |                 Description                   |
+------------------+----------------------------------------------+
|   unsupported    |        The 'action' is not supported.         |
|                  |                                               |
|      unable      |     The 'action' could not be accomplished.   |
|                  |                                               |
| data-unsupported |    The data item referenced in a 'send-data'  |
|                  |           request is not supported.           |
+------------------+----------------------------------------------+
```

Table 3: eCall Reason Registry

13.8.4. eCall Lamp ID Registry

This document creates a new sub-registry called "eCall Lamp ID
Registry" to standardize the names of automotive lamps (lights). As
defined in [RFC5226], this registry operates under "Expert Review"
rules. The expert should determine that the proposed lamp name is
clearly understandable and is sufficiently distinguishable from other
lamp names.

The content of this registry includes:

Name: The identifier to be used in the 'lamp-ID' attribute of an
   eCall control 'request' element.

Description: A description of the lamp (light).

The initial set of values is listed in Table 4.

```
+----------------+------------------------------------------+
|      Name      |                Description                |
+----------------+------------------------------------------+
|      head      | The main lamps used to light the road ahead |
|                |                                          |
|    interior    |    Interior lamp, often at the top center |
|                |                                          |
|   fog-front    |              Front fog lamps             |
|                |                                          |
|    fog-rear    |               Rear fog lamps             |
|                |                                          |
|     brake      |           Brake indicator lamps          |
|                |                                          |
| position-front |    Front position/parking/standing lamps |
|                |                                          |
| position-rear  |    Rear position/parking/standing lamps  |
|                |                                          |
|   turn-left    |         Left turn/directional lamps      |
|                |                                          |
|   turn-right   |        Right turn/directional lamps      |
|                |                                          |
|     hazard     |           Hazard/four-way lamps          |
+----------------+------------------------------------------+
```

                 Table 4: eCall Lamp ID Registry Initial Values

14. Contributors

   Brian Rosen was a co-author of the original document upon which this
   document is based.

15. Acknowledgements

   We would like to thank Bob Williams and Ban Al-Bakri for their
   feedback and suggestions, and Keith Drage for his review comments.
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   upon which this document is based.

16. Changes from Previous Versions

16.1. Changes from draft-ietf-00 to draft-ietf-01

   o Added further discussion of test calls

   o Added further clarification to the document scope

o Mentioned that multi-region vehicles may need to support other
   crash notification specifications in addition to eCall

o Added details of the eCall metadata and control functionality

o Added IANA registration for the MIME content type for the eCall
   control object

o Added IANA registries for protocol elements and tokens used in the
   eCall control object

o Minor wording improvements and clarifications

16.2. Changes from draft-gellens-03 to draft-ietf-00

o Renamed from draft-gellens- to draft-ietf-.

o Added mention of and reference to ETSI TR "Mobile Standards Group
   (MSG); eCall for VoIP"

o Added text to Introduction regarding migration/co-existence being
   out of scope

o Added mention in Security Considerations that even if the network-
   supplied location is just the cell site, this can be useful as a
   sanity check on the IVS-supplied location

o Minor wording improvements and clarifications

16.3. Changes from draft-gellens-02 to -03

o Clarifications and editorial improvements.

16.4. Changes from draft-gellens-01 to -02

o Minor wording improvements

o Removed ".automatic" and ".manual" from
   "urn:service:test.sos.ecall" registration and discussion text.

16.5. Changes from draft-gellens-00 to -01

o Now using 'EmergencyCallData' for purpose parameter values and
   MIME subtypes, in accordance with changes to
   [additional-data-draft]

o Added reference to RFC 6443

o Fixed bug that caused Figure captions to not appear

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