

POIX_EX
Location Information
Expression Format
GUIDELINE

VERSION 2.0

ITS FORUM RC-001

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Introduction

Items pertaining to the integration of “POIX_MP” (created by Association of Electronic Technology for Automobile Traffic & Driving) and “POIX_ARIB” (location information communication guideline created by ITS Info-communications Forum) are described below.

(1) POIX-based extended standards

The Location Information/Security WG of the ITS Mobile Communications System Expert Group in the ITS Info-communications Forum has been working on a standardization proposal for a location information exchange format. To prevent the creation of excessive standards, the items of location information and the notation method were specified in POIX_ARIB (location information communication guideline), created as an extension of POIX, and released as the location information communication guideline.

(2) Unified standards

“POIX_MP” (created by Association of Electronic Technology for Automobile Traffic & Driving) and “POIX_ARIB” (location information communication guideline created by ITS Info-communications Forum) were each developed as a standard to extend POIX. While both these standards are extensions of POIX, each extends different areas. To prevent the creation of excessive standards, both organizations have been carrying out discussions and coordination work aimed at creating a standard proposal that is unified and standardized. As shown in Table 1 later in this document, both of these standards have been integrated into “POIX_EX”.

1 Guideline for creating location information exchange standard

This chapter sets forth the guideline that was adopted to create the standard for a location information exchange format. To exchange information smoothly, the information content and format require flexibility and universality. The following sections describe how the standard was created to enable flexibility and universality needed during each of four phases of location information processing: (1) generating location information, (2) writing location information, (3) exchanging location information and (4) using location information.

1.1 Generating location information

An investigation was conducted on the type of content or items that would be needed when generating location information. Since location information is not existing information, the first step in exchanging locations is to generate the information of the locations to be exchanged. However, location information is not as clear as generally believed. While street addresses are clearly location information, non-mobile phone numbers can also become location information. For mobile entities, latitude, longitude and elevation could comprise the location information, but this location information requires a time stamp, since location information for a mobile entity without a time stamp is almost completely meaningless. Therefore, the time at which a location is measured can be considered part of the location information. This idea can be extended to fixed objects also. Street addresses or fixed objects such as buildings change over the long term. There may be changes to items such as names in street addresses, administrative areas or building names. The selection of items of location information was made in consideration of such possible changes.

Latitude, longitude and elevation could be used as the location information framework. This information was specified as the absolute location expression. Along with this information, relative location expressions were also specified. In theory, an absolute location expression alone is sufficient to express the location of a geographic feature, but in actual practice, absolute location information contains measurement error. When a location is mapped onto a map, the superimposition of the map's own error may create an error in the relative locations of the geographic feature on the map, and the location at which its absolute location is mapped. For example, a target with a measured absolute location may be mapped to the south side of a geographic feature when it is actually on the north side. It was therefore decided to include items of relative location information to assist the absolute location information.

Items of location information were designed to enable universal use not only with cars, but also with services that require location information. In general, the items were extracted by referring to the MOSTEC/MOPA specifications, and to the applications/services envisioned by the conference of five ITS-related government agencies in June 2000.

1.2 Writing location information

There are three conditions to consider when writing the location information specified in Section 1.1—1) notation, 2) language and 3) code. To create more general solutions to these

issues, the location information items described above were specified at a conceptual level, and set no restrictions. The notation itself has not been specified.

This standard proposal provides methods of writing location information using XML as examples. When using XML, the code system will inevitably follow the XML standard.

Notation is the specific expression of location information concepts. It addresses the issue of whether to write, for example, “139 degrees 24 minutes 23 seconds east longitude, 35 degrees, 24 minutes, 51 seconds north latitude, intersection, 63.0 m above sea level” or to write “E: 139° 24’ 23”, N: 35° 24’ 51”, H: 63.0”. The standard makes no specifications regarding notation.

In the XML notation given as examples, information is specified by XML tag names. Specifically, <lat> or <latitude>. If this notation is used differently by different users, or is vague, it will be difficult to exchange it between machines in a universal and flexible manner, and to reuse it. It is specified in the Document Type Definition (DTD). Codes are specified by XML, so if using XML, those specifications will be followed.

1.3 Exchanging location information

The method of exchanging location information, in other words, the transmission media and the transmission protocols used on them, are not included in this specification, since various situations can be envisioned for their use. Possible Internet-based file transfer methods could include transfer by FTP (the most frequently used protocol), transfer by files attached to SMTP email, and data exchange with service servers using HTTP and “get”, “put” and “post” commands. Alternately, wireless transfer is also possible using protocols such as WAP, and if needed, this type of application-level protocol can be developed independently within service systems. XML files can also be physically transferred using memory storage media such as floppy disks.

1.4 Using location information

This standard does not specify mandatory items of location information. All items are optional, since in some cases, even the latitude, longitude and elevation information specified as the absolute location is not required, and relative location is sufficient. In some cases, just a street address and non-mobile phone number are sufficient. This information can be written as a “note”. Given a street address, location mapping onto a map should be easy when using a map database, and services could be envisioned for mapping a location onto a map when given a non-mobile phone number. Since all items are optional, the format permits blank location information with no content. Such information should be handled by the user.

1.5 Coordination with other groups

Coordination is secured with the groups below. Many parts of this standard proposal adopt MOSTEC’s POIX standard, and some parts adopt the MOPA standard.

MOSTEC (Mobile Information Standard Technical Committee)
<http://mostec.aplix.co.jp/>

MOPA (Mobile Office Promotion Association)
<http://www.mopa.or.jp/japanese/index.html>

Navigation System Researchers' Association

2 Structure

There are several specific methods that could be used to write location information. XML is the most promising method for the future, and standards such as MOSTEC's POIX and G-XML (PD-GXML) are XML-based methods of writing location information. This ad-hoc standardization proposal calls for location information to be written using the basic XML structure, and aims to enable actual use by a method such as conversion to XML.

In deciding on the structure to use, it was decided to base it on POIX (which is already in existence and operation). Some of the MOPA location information URLs and their functions were also added. To arbitrarily create a standardization proposal with an operation format different from existing formats would impede the development of the industry. However, to meet the needs of intelligent transport systems, the creators of this ad-hoc proposal believe that the standard for the location information expression format should expand the original POIX standard and some of the location information URL standard with items A, B and C below.

A. Handling location expressions that are incomplete as latitude/longitude expressions

■ Between different map databases

Precision is one of the real-world problems latitude/longitude settings need to address. When calculating the latitude/longitude of points, each measurement can't be made precisely. Normally, latitude/longitude are calculated from GPS location measurement and map location. Therefore, there is an error of about 10 meters. If this location information is sent to the receiver, and the receiver uses it, it will have the same GPS location measurement error and map error. The relative error can therefore increase to over 10 meters, which could be fatal for map referencing, since an indicated location could be on the wrong side of a river or road.

This problem can be solved by indicating relative relationships to nearby geographic features (such as roads or rivers) in addition to latitude/longitude.

■ Global compatibility

In many foreign countries, maps are not as developed as they are in Japan. It's therefore difficult to express the latitude/longitude of every POI (point of interest). The basic concept for location notation in many foreign countries is the location relative to a road. Permitting this notation method is the most important point for global compatibility.

To handle location expressions that are incomplete as latitude/longitude expressions, nearby geographic features such as roads or rivers are used to express locations. Whether a geographic feature is a road or a river, its geometrical shape is a line, so it will enable locations to be expressed as distances (distances along the geographic feature) from a

reference point. Locations beside a road but not on it can be expressed as either side of the road relative to previously described locations. Intersections can be used as reference locations, since they are geometrically easy to specify.

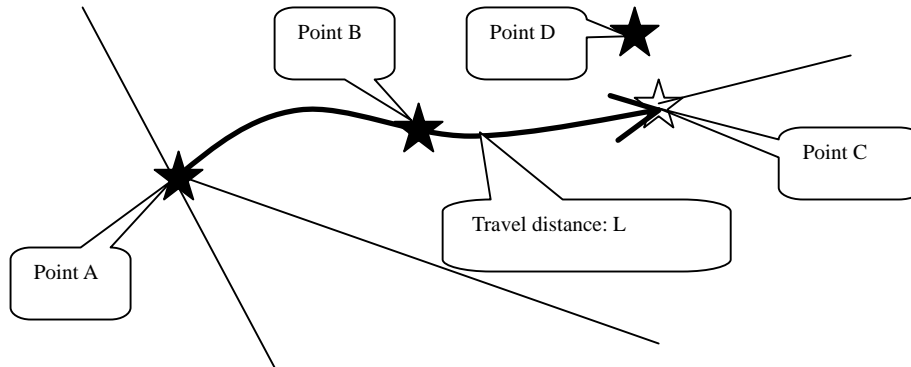


Figure 1 Example location specified using geographic feature

Figure 1 shows an example of specifying a location using a geographic feature (a road in this case).

In this example, the location of point D is expressed.

Point A: Configuration point/reference point

Point B: Configuration point

Point C: Auxiliary point. Point D is on the left of point C in the direction of the arrow in the diagram.

The data to send is as follows:

Coordinates and type (intersection) of point A, coordinates of point B, travel distance L, left side

The mechanism used to express point D is described below.

First, a reference point is defined by point A. The type of point A is “intersection”. The receiver (interpreter) of the information uses the map or other database they have to search intersections near the coordinates of point A. Even if the coordinates of the intersection on the receiver’s map don’t match the sent point A coordinates due to a difference in precision, matching is still possible.

There are four roads connected to this intersection. The next step is to specify one road from

among these four. Points A and B are configuration points (point A is also a reference point), and the road and the direction on the road are defined from them. The coordinates of point B may not be exactly located on the road on the map that the receiver has, but the point should be near that road, enabling the road to be specified. The direction on the road can also be specified by setting the direction from point A to point B as the forward direction.

Next, the travel distance L can be used to determine the location of auxiliary point C from reference point A in the specified direction on the specified road. Point D can be specified by using the information “on the left”, when moving in the specified direction from the location of auxiliary point C.

Point D is determined in this way.

Next is an example in which 3 or more configuration points are needed.

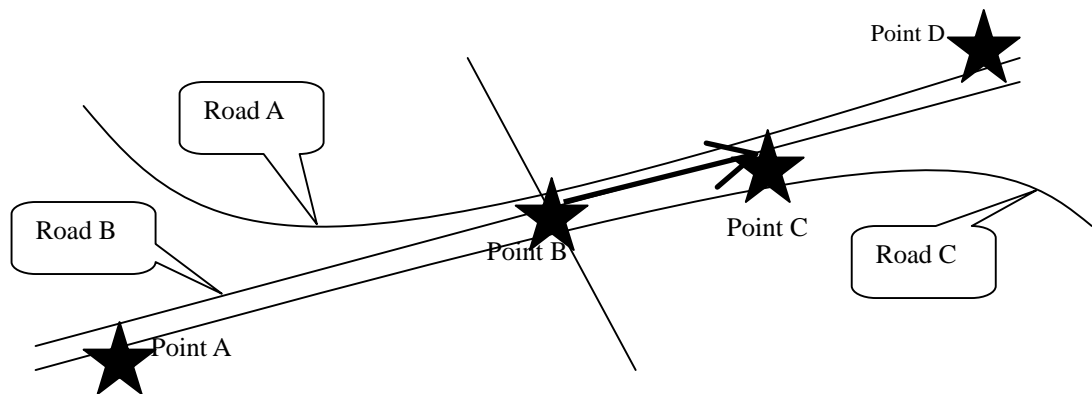


Figure 2 Example when 3 or more configuration points are needed

The location of point C in Figure 2 is expressed by the method described below.

- In this example, point C is on the right of road B in the direction moving from point A to point B to point D. The intersection used as the reference point is point B. If this map is accurate, there are three intersections in the vicinity of point B, but are extremely close together, so are difficult to distinguish. Therefore, even if the location of point B is expressed, it's difficult to specify its location on the three intersections, so it's not easy to specify the roads. There are three similar roads: road A, road B and road C. To distinguish them, three configuration points (point A, point B and point D) are used. These three points can be used to definitively set road B, as distinguished from road A or road C. So the location of point C can be expressed by the locations of points A, B and D, by the reference point type (= intersection) of point B (the reference point), by the travel distance from point B, and by the side (right).

B. Expressing lines and areas as well as points

- Expressions of lines: Expressing lines along long geographic features such as roads or rivers. These geographic features can also be just line segments between two points. An example expression of a line is “From the Ebina service area to the Atsugi interchange in the inbound direction on the Tomei Expressway”.
- Expressions of areas: Examples include “weather forecast area”, “administrative area”, “fishing area”, “earthquake zone”, “range of fugitive” and “free delivery area”.

C. Event-driven expressions

- Incorporating action information into location information

This type of information has been conceived from the idea that there will be many applications that send actions (particularly guidance) related to location information to the receiver. Appendix 1 provides an example of this type of application.

In addition to the expressions described in Items A, B and C above, the usefulness of expressions such as “The end closest to Yurakucho on platform 5 of Tokyo station” (hereinafter referred to as natural language expressions) was a major topic of discussion for this ad-hoc proposal. While numerical expressions such as latitude/longitude are extremely easy to process by computers, it remains to be seen whether location information senders will be able to easily create such latitude/longitude information, and whether receivers will be able to effectively use it. Discussion was held on the issue of whether there is a need for systems that can handle natural language expressions (such as the previous example), and whether the standardization proposal should include preparations for expressing location information in natural language expression format.

The details are given in Appendix 2. The conclusion reached was that natural language expressions will only be implemented at the comment level. It was decided that the standardization proposal would not include a specification using XML tags or another method to divide natural language into its elements, provide each with meaning and process them by the computer.

2.1 Structure table

Table 1 shows the structure devised to extend the method of writing location information. Words in the table correspond to tag names when writing XML. Therefore, when writing location information in XML in conformance with this standardization proposal, the tag names used will be the words in the table.

The shaded parts of the table are extensions to POIX. The meanings of the symbols after each tag are as follows:

Notation pertaining to number of times an element appears

|: or ; This “or” is not the logical OR operation, but indicates either one of the two.
Used with ().

?: 0, 1
*: 0 to infinity
+: 1 to infinity
None: Must be once

As described previously, this standard only specifies structure and items. XML notation is given as an example. In other words, the information could conceivably be written using methods other than XML (such as a hypothetical format table in regular byte units). In that case, if the format structure and meanings of items conform to this standard, that data could be converted to XML. The meanings of items depend on the structure, so even when various types of expressions are used, the meanings of items should conform to this standard. When information is written in XML, the tag names should match the names used in this standard.

Table 1 POIX_EX structure

Line No.	1st layer	2nd layer	3rd layer	4th layer	5th layer	6th layer	7th layer	Remarks
1	poix_ex	poix+	<i>format</i>	<i>datum</i>				
2				<i>unit</i>				
3				<i>type?</i>				
4				<i>author*</i>				
5				<i>time?</i>				
6			<i>poi</i>	<i>point</i>	<i>pos</i>	<i>lat</i>		
7						<i>lon</i>		
8						<i>herror?</i>		
9						<i>alt?</i>		
10						<i>verror?</i>		
11						<i>name?</i>		
12						<i>time?</i>		
13						<i>speed?</i>		
14						<i>dir?</i>		
15						<i>db_use?</i>	db_name	
16							db_index	
17					geo_shape?	geo_type		
18						prerference?	<i>pos+</i>	
19						reference	reference_type	
20							<i>pos</i>	
21						postreference?	<i>pos+</i>	
22						distance		
23						side?		
24				mp_area?	bl			Specifies range of multiple "point" information.
25					tr			
26				line?	<i>point</i>			
27					<i>point</i>			
28				area?	circle?	<i>point</i>		
29						radius		
30					polygon?	<i>point</i>		
31						<i>point</i>		
32						<i>point+</i>		
33				<i>move?</i>	<i>method?</i>			
34					<i>speed?</i>			
35					<i>dir?</i>			
36					<i>locus?</i>	<i>pos*</i>		
37				<i>name*</i>	<i>nb</i>			
38					<i>rt?</i>			
39				<i>access*</i>	<i>method</i>			
40					<i>Ipoint</i>	<i>iclass</i>		
41						<i>pos</i>		
42						<i>name?</i>		
43					<i>Tpoint</i>	<i>tclass</i>		
44						<i>pos</i>		
45						<i>name?</i>		
46					<i>route?</i>	<i>pol</i>	<i>pos*</i>	
47					<i>note?</i>			
48				<i>contact*</i>				
49				<i>note*</i>				
50				category*				Specifies category.
51				<i>mate*</i>				
52				icon?	icvendor			Icon information
53					icsrc			
54			action*	exe_condition?				
55				kill_condition?				

56			execute+	built_in_function script applet objfile			
57		map_re	mfm				
58		q*	scl				
59			msz				
60			filename				

2.2 Element descriptions

This section describes the words (elements) in the structure shown in Table 1. Items in italics are used in the same way as POIX tags. Refer to the POIX specifications for these items. The units are the same as for POIX.

To aid understanding, examples of information written in XML are provided below. This notation method is called POIX_EX. POIX_EX should ideally be used by extending POIX with “namespace” to improve POIX_EX’s affinity with POIX, which is already in actual operation.

2.2.1 poix_ex

Location information element

Indicates that information is location information written in POIX_EX.

POIX_EX can consist of one or more location information elements (POIX).

2.2.2 format

Type information

Indicates written information (geodetic system, coordinate system, target type (mobile entity or non-mobile entity), information creator and information creation date/time) used in POIX_ARIB, as type information. Enables simplification of processing, writing and management. Also prevents location information with different coordinate systems from being mixed together and increasing information complexity. The individual elements are given below.

2.2.3 datum

Geodetic system

Indicates the geodetic system used.

Example	<datum>wgs84</datum>	WGS-84
	<datum>itrf</datum>	ITRF
	<datum>tokyo</datum>	Tokyo datum

2.2.4 *unit*

Coordinate system

Indicates the coordinate system used.

Example	<unit>degree</unit>	Degree units	(135.2094)
	<unit>dms</unit>	Degree/minute/second units	(135,12,34)

2.2.5 *type*

Information type

A blank element indicating an attribute standing for whether the target at the location expressed is a mobile or non-mobile entity.

2.2.6 *author*

Information creator

Indicates the information creator.

2.2.7 *time*

Information creation date/time

Indicates the date/time the POIX_ARIB information was created (when under a “format” tag).

Indicates the POS generation time (when under a “POS” tag).

2.2.8 *poi*

POI information

Indicates the POI information body. POI information consists of the target’s location and name, way to go to the indicated target, contact information for the target, description of the target, and related POIX_ARIB information. For mobile entities, a string of points indicating the past locus can be written as needed. The individual elements are given below.

2.2.9 *point*

Representative location

A representative location of the target. Representative locations are expressed by the “pos” element below, which indicates location.

2.2.10 *pos*

Location

Indicates location and precision. Location is expressed by items such as latitude, longitude, area error, altitude and altitude error.

2.2.11 *lat*

Latitude

Indicates the latitude of a geographic point.

2.2.12 *lon*

Longitude

Indicates the longitude of a geographic point.

2.2.13 *herror*

Area error

Indicates the area error of a location indicated by the “lat” and “lon” elements.

2.2.14 *alt*

Altitude

Indicates the altitude (height above sea level) of a geographic point.

2.2.15 *verror*

Altitude error

Indicates the altitude error.

2.2.16 *db_use*

Database use

Indicates that the location expression uses a database. Besides the most basic items such as the latitude/longitude expression, location information can include street addresses, phone numbers and location codes. The concept of using a database for the notation of these items has been included. The individual elements are given below.

2.2.17 *db_name*

Database name

Indicates the name or URI of the location information database used. The notation used for postal codes is “zip_code”. The notation used for street addresses is “address”.

2.2.18 *db_index*

DB_INDEX

Indicates the index used to extract the element (location) from the specified location information database. Examples are shown below.

Database name	DB_INDEX
Address	XX, XX-cho, XX-ku, Yokohama, Kanagawa
Zip_code	224-XXXX
Telephone numbers	+81-45-123-4567
VICS addresses	Secondary mesh number, link number,...
Location codes	4455093
Customer list	Ichiro Yamada
Station names	JR Tokyo Station

2.2.19 *geo_shape*

Shape of geographic feature

Indicates that the location is expressed using a long geographic feature such as a road or railway line. The individual elements are given below.

Below is a usage example based on the diagram shown in Figure 1.

In this example, the latitude and longitude of points A and B are written as *lat_a*, *lon_a*, *lat_b* and *lon_b*.

```

<geo_shape>
  <geo_type >road</ geo_type >
  <reference>
    <reference_type > intersection </ reference_type >
    <pos>
      <lat>lat_a</lat>
      <lon>lon_a</lon>
    </pos>
  </reference>
  <postreference>
    <pos>
      <lat>lat_b</lat>
      <lon>lon_b</lon>
    </pos>
  </postreference>
  <distance >L</ distance >
  <side > left </ side >
</geo_shape>

```

←Geographic feature is a road

Configuration point A

Configuration point A is surrounded by reference tags, so it is also the reference point.

Configuration point B

“geo_type” is written directly after “geo_shape”. After that, the configuration points (2 or more) are written. There are three types of configuration points: reference points (“reference”), configuration points before reference points (“prereference”), and configuration points after reference points (“postreference”). The order of these configuration points is important: they must be placed in order of a direction on the geographic feature.

The direction on the geographic feature is defined by this order. Also specified is which side (“side”) of the place the target is on, after advancing along the geographic feature for the distance (“distance”) in the indicated direction from the reference point.

The definitions of “configuration point” and “reference point” are as follows:

Configuration point:

A point on or near a geographic feature, used to specify it. Shapes of geographic

features are expressed by two or more configuration points. The order of configuration points indicates the direction on that geographic feature.

Reference point:

Used to express locations on a geographic feature. One of the feature's configuration points is also the reference point.

2.2.20 *geo_type*

Geographic feature type

Indicates the type of geographic feature used in a location expression. Can be "road", "railway" or "river".

2.2.21 *prereference*

Configuration point before reference point

Of the two or more configuration points located along a geographic feature, the configuration point before the configuration point used as the reference point (in the given order).

2.2.22 *reference*

Configuration point used as reference point

Of the two or more configuration points located along a geographic feature, the configuration point used as the reference point.

2.2.23 *reference_type*

Reference point type

Expresses the reference point type. Generally, "intersection" if the geographic feature is a road, and "station" if the geographic feature is a railway line.

2.2.24 *postreference*

Configuration point after reference point

Of the two or more points located along a geographic feature, the configuration point after the configuration point used as the reference point (in the given order).

2.2.25 distance

Distance from reference point

Indicates the distance from the reference point along the geographic feature, following the direction along the geographic feature expressed by the order of configuration points. Points on the indicated geographic feature are called “auxiliary points”.

2.2.26 side

Side

Indicates whether the final location to be expressed is on the right side or left side of the “auxiliary point” (when moving on the geographic feature in the direction indicated by the list of configuration points), or on the geographic feature. “Right”, “left” or “on”. If “side” is omitted, it is regarded as “on”.

2.2.27 mp_area

Area in which multiple points exist

A structured parameter expressing an area indicated by a rectangle for an area in which POI information exists.

2.2.28 bl

Bottom-left coordinates

A parameter that expresses the bottom-left X coordinate and bottom-left Y coordinate of an area indicated by a rectangle, for an area in which POI information exists.

2.2.29 tr

Top-right coordinates

A parameter that expresses the top-right X coordinate and top-right Y coordinate of an area indicated by a rectangle, for an area in which POI information exists.

2.2.30 line

Line

Expresses a line segment joining points indicated by two “point” elements. Alternately,

expresses a straight line or curve along a geographic feature indicated by two points. The geographic feature is specified by “point” attributes.

Example: “The interval from the Ebina service area to the Atsugi interchange in the outbound direction on the Tomei Expressway”

2.2.31 area

Area

Expresses a zone indicated by an area. The individual elements are given below. Examples include “weather forecast area”, “fishing area”, “range of fugitive” and “base station service area”.

2.2.32 circle

Circle

Indicates a circle by a center point and radius with the center point at its center. The individual elements are given below.

2.2.33 radius

Radius

Indicates a radius.

2.2.34 polygon

Polygon

Expresses a polygon indicated by multiple (at least 3) points.

2.2.35 move

Movement of mobile entity

Indicates its movement by its movement method, movement speed, movement direction and locus when the target is a mobile entity.

2.2.36 *method*

Movement method

Indicates the current movement method of a mobile entity. The syntax and content are the same as for the “method” sub-element of the “access” element.

2.2.37 *speed*

Movement speed

A positive integer indicating the current movement speed of a mobile entity (in km/h).

2.2.38 *dir*

Movement direction

A positive integer indicating the current movement direction of a mobile entity, in degrees counterclockwise with north as 0.

2.2.39 *locus*

String of locus coordinate points

Indicates a string of locus coordinate points. Coordinate points are indicated by the method specified in the “pos” element.

2.2.40 *name*

Name

Indicates the name of the target.

2.2.41 *nb*

Name body

Indicates the name of the target.

2.2.42 *rt*

Reading

Indicates the target name's *furigana* or abbreviation, or a second name for the target.

2.2.43 *note*

Description

Gives a description of the target.

2.2.44 *access*

Access method

Consists of the movement method, introductory point, terminal point, guidance route and description. Indicates the method used to go to the target location. The description is given by the method specified in the "note" element.

2.2.45 *method*

Movement method

Indicates the movement method from the introductory point to the terminal point.

2.2.46 *ipoint*

Introductory point

Indicates the introductory point from the introductory point type, location and name. Location and name are indicated by the method specified in the "pos" and "name" elements.

2.2.47 *iclass*

Introductory point type

Indicates the introductory point type.

2.2.48 *tpoint*

Terminal point

Indicates the terminal point from the terminal point type, location and name. Location and name are indicated by the method specified in the “pos” and “name” elements.

2.2.49 *tclass*

Terminal point type

Indicates the terminal point type.

2.2.50 *route*

Guidance route

Indicates the route from the introductory point to the terminal point by the sub-element “pol”.

2.2.51 *pol*

String of route coordinate points

Indicates a string of route coordinate points. Coordinate points are indicated by the method specified in the “pos” element.

2.2.52 *contact*

Contact information

Indicates the target’s contact information. The contact information is specified by the contact information hyper reference. Supplementary descriptions for contact information are given by text strings.

2.2.53 *category*

Category

A parameter expressing the target’s genre information.

2.2.54 mate

Related POIX

Indicates other POIX related to the target. The information is specified by the related POIX hyper reference. The description of the relationship is given by a text string.

2.2.55 icon

Icon

A structured parameter indicating the target on the map by an icon.

In addition to specification by the parameters below, could also be specified by “category”.

2.2.56 icvendor

Icon vendor

A parameter that specifies the icon file by vendor-specific information.

2.2.57 icsrc

Icon source

A parameter that specifies the icon file by URL or directory.

2.2.58 action

Condition operation

Instructs the receiver of the location information to perform an operation when a particular condition is met. The individual elements are given below.

2.2.59 exe_condition

Start condition

Indicates a condition, using location or other information. When this condition is “True”, the “execute” operation described below is executed.

2.2.60 kill_condition

End condition

Indicates a condition, using location or other information. When this condition is “True”, the “execute” operation described below is aborted.

2.2.61 execute

Start

Specifies an application to be executed by the information receiver, its arguments and data file name, and executes it. If the application ends automatically after executing once (such as a sound application), the execution result may remain (such as by being displayed in the screen) after the application is executed once. Arguments can be used to specify end conditions such as operation time, and “kill_condition” can be used to specify an end condition.

2.2.62 built_in_function

Built-in function

Indicates a built-in function.

2.2.63 script

Script

Indicates the information is an execution script.

2.2.64 applet

Applet

Indicates that a Java applet is specified.

2.2.65 objfile

File to be executed

Indicates the information is the name of an object file to be executed. Normally the application is defined by information such as the file extension, the application starts, and the file to be executed is read.

Example

arib.bmp← Bitmap file, so bmp viewer starts and reads file.

bgm1.mid← Music data, so MIDI player starts and bgm1.mid is played.

Usage example

```
<action>
  <exe_condition>dist(CURRENT_POS, REF_POS1)=<500</exe_condition>
  <execute><built_in_function>beep()</ built_in_function></execute>
</action>
<action>
  <exe_condition>dist(CURRENT_POS, REF_POS2)=<100</exe_condition>
  <kill_condition>dist(CURRENT_POS, REF_POS3)=<100</kill_condition>
  <execute><objfile>bgm1.mid </objfile></ execute>
</action>
```

Note: To make the example easy to understand, the “less than” symbol (<) has been left unchanged. However, when actually creating code, “<” must be written instead of “<”, to distinguish it from “<” in tags.

The “dist” function is a function that expresses the distance between two points. This function name is for reference. CURRENT_POS corresponds to an environmental variable, and expresses the real-time location of the equipment that received POIX_ARIB. REF_POS 1 to REF_POS 3 are reference locations defined separately. The example code specifies operations on mobile entity equipment.

In this example, there are two operations.

The first operation is to execute beep() when the current location is within 500 meters of REF_POS1. The equipment plays the beep sound from the speaker.

The second operation is to play “bgm1.mid” when the current location is within 100 meters of REF_POS2. Whether to stop playback after one time or to repeat playback is determined by the equipment specifications. When specifying an explicit end condition such as stopping playback after 20 minutes, an argument indicating the end condition may be specified, in addition to the “bgm1.mid” file name. In either case, playback of “bgm1.mid” stops when the current location is within 100 meters of REF_POS3.

2.2.66 map_req

Map request

Requests map downloading from the sender of poix_arib. The individual elements are given below. Except for “filename”, the individual elements are the same as the tags in the MOPA location information URL standard, so refer to the specifications in this standard.

2.2.67 mfm

Map type

Specifies the format of the map data to request, such as “gif”, “png” or “dfm”.

<mfm>gif</mfm>

2.2.68 scl

Map scale

Specifies the length (scale) of each pixel (in meters), for the display resolution of the equipment requesting the map.

<scl>10</scl>

2.2.69 msg

Map image size

Indicates the size (in pixels; width x height) of the requested map.

<msg>640x400</msg>

2.2.70 filename

Acquired map file name

Indicates the file name when the requested map is sent.

<filename>arib.gif</filename>