ETSI TS 103 544-7 V1.3.0 (2017-10)

TECHNICAL SPECIFICATION

Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 7: GPS Data Service

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 7 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.1].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document is part of the MirrorLink® specification which specifies an interface for enabling remote user interaction of a mobile device via another device. The present document is written having a vehicle head-unit to interact with the mobile device in mind, but it will similarly apply for other devices, which provide a colour display, audio input/output and user input mechanisms.

The present document specifies GPS service based on SBP (Service Binary Protocol) framework. The service is used to provide better GPS data in car environments. The present document is based on NMEA specification 0183 [1] as bearer of GPS.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1]   NMEA 0183 version 3.01 (January 2002): "Standard For Interfacing Marine Electronic Devices".

NOTE: Available at http://www.plaisance-pratique.com/IMG/pdf/NMEA0183-2.pdf.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1]   ETSI TS 103 544-1 (V1.3.0): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 1: Connectivity".

3 Abbreviations

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

GPS   Global Positioning System
NMEA   National Marine Electronics Association

4 Data Service Definition

4.1 GPS Data Service Version 1.0

```
/** The purpose of GPS service is to provide better GPS data in car
 *  environments. The specification relies on NMEA as bearer of GPS
 *  data.
 *  @version 1.0
 */
SERVICE com.mirrorlink.GPS {
  /** SUPPORTED_SENTENCES
   */
  ENUM<INT> SUPPORTED_SENTENCES {
  /** SUPPORT_GGA
   */
  SUPPORT_GGA = 0x01,
  /** SUPPORT_GLL
   */
  SUPPORT_GLL = 0x02,
  /** SUPPORT_GSA
   */
  SUPPORT_GSA = 0x04,
  /** SUPPORT_GSV
   */
  SUPPORT_GSV = 0x08,
  /** SUPPORT_RMC
   */
  SUPPORT_RMC = 0x10,
  /** SUPPORT_VTG
   */
  SUPPORT_VTG = 0x20,
  /** SUPPORT_GST
   */
  SUPPORT_GST = 0x40
  };
/** NMEA object carrying NMEA sentence
 *  This Object delivers NMEA-0183 v3.0 [1] compatible NMEA strings
 *  included in the "data" member variable. Among all NMEA messages,
 *  only following 7 messages are supported.
 *   - GGA: Global Positioning System Fixed Data
 *   - GLL: Geographic Position - Latitude/Longitude
 *   - GSA: GNSS DOP and Active Satellites
 *   - GSV: GNSS Satellites in View
 *   - RMC: Recommended Minimum Specific GNSS Data
 *   - VTG: Course Over Ground and Ground Speed
 *   - GST: GPS Pseudo Range Noise (PRN) statistics
 *  As some NMEA sentences are delivering the same information
 *  redundantly, it is not necessary to support all NMEA sentences.
 *  It is up to the server implementation to decide necessary
 *  combinations. As the Object can be used even for non-GPS-based
 *  positioning method, minimum set of messages can be, for example, GLL
 *  only. The client for the service can Get NMEA_description object to
 *  check which sentences are supported.
 *  NMEA object shall support the subscription type of regular interval.
 *  The minimum subscription interval of NMEA Object supported by the
 *  service server shall be less than or equal to 1 second. In some server
 *  implementation, server may decide to send each NMEA sentence as
 *  separate SBP message rather than combining them into one message.
 *  In that case, subscription interval is not the interval between
 *  each sentence, but it should be the interval where the same sentence
 *  is repeated. And depending on the situation, some NMEA sentences may
 *  NOT be available for some time. For example, if location fix-up is
 *  not available yet, server may send only GSV sentence.
 *  Note that getting NMEA object may return just one NMEA sentence
 *  which does not necessarily include positioning data. NMEA object
 *  is intended for being used with Subscribe command, and sequences
 *  of NMEA sentences should be monitored to get meaningful information.
 *  @mandatory, @readable, @version 1.0, @uid 0x0aac4540
 */
Object NMEA {
  /** NMEA sentences
   *  NMEA messages as byte array. Multiple NMEA sentences can be
   *  combined into single array.
   *  @mandatory, @uid 0x144a776f
   */
```

```
  BYTES data;
  /** UTC time of data
   * Time stamp of the NMEA data embedded. It is a UTC time associated
   * with the NMEA sentences contained.
   * In case UTC time associated with the NMEA sentence is unknown, the
   * GPS Data Source shall set the timestamp value to zero (0).
   * @mandatory, @uid 0x59413fd1
   */
  TIME timeStamp;
  };
/** Provides configuration information of NMEA object
 * The NMEA_description should be accessed before NMEA object is
 * subscribed. Accessing NMEA_description object while NMEA object is
 * accessed may fail depending on server's resource status.
 * @mandatory, @readable, @version: 1.0, @uid 0x9d08b19d
 */
Object NMEA_description {
  /** bit wise OR of supported sentences, as defined in the enumeration
   * ENUM<SUPPORTED_SENTENCES>.
   * The data source implementation shall support at least one active
   * command.
   * @mandatory, @uid 0x6e72b167
   */
  INT supportedSentences;
  };
};
```

4.2   GPS Data Service Version 2.0

```
SERVICE com.mirrorlink.GPS : @version 1.0 {
ENUM<INT> definedCoordinateSystem {
  /** WGS-84 coordinate system
   * @mandatory
   */
  CS_WGS84 = 0x00000001;
  /** GCJ-02 coordinate system
   * @optional
   */
  CS_GCJ02 = 0x00000002;
  /** GCJ-02 coordinate system
   * @optional
   */
  CS_Proprietary = 0x80000000;
  };
/** This object returns bit flags of supported coordinate systems
 * from the Location Data source.
 * @mandatory, @readable, @version 2.0, @uid 0x6f1c2428
 */
Object availableCoordinateSystems {
  /** Bit wise OR of all supported coordinate systems by the data
   * source. Possible coordinate systems are defined in the
   * definedCoordinateSystem enumeration.
   * This object should be accessed before accessing any of the other
   * objects. A location data source shall support WGS-84, unless the
   * device is operating in China.
   * @mandatory, @uid 0x0885cf07
   */
  int coordinateSystems;
  };
/** This object contains the currently used coordinate system from the
 * Location Data source. The object can be set from data sink to
 * change the coordinate system.
 * It should be accessed before subscribing to the NMEA
 * object. The object's default value should be cs_WGS-84, unless the
 * device is operating in China, where it may be cs_GCJ02.
 * If the object is set to a coordinate system, unknown or not
 * supported, the location data source shall indicate the location
 * as not being available.
 * The coordinate system shall not be changed, after subscription
 * to the NMEA object. The location data sink may change the
 * coordinate system if it has not subscribed to the NMEA
 * object.
 * The data source shall honor the selected coordinate system.
 * @mandatory, @configurable, @version 2.0, @uid 0x17ab51db
 */
Object currentCoordinateSystem {
```

```
  /** Provide coordinate system, the source is currently using
   *  @mandatory, @uid 0xd2394c6c
   */
  ENUM<definedCoordinateSystem> coordinateSystem;
  };
};
```

5   SBP Binding

The GPS Data Services uses the following objects and their access capabilities:

Object Name	Access Type	Subscription Type
NMEA	READABLE	ON_CHANGE, REGULAR, or AUTO
NMEA_description	READABLE	NONE
availableCoordinateSystems	READABLE	NONE
currentCoordinateSystem	CONFIGURABLE	NONE

If the GPS receiver is not available, the SBP source endpoint shall return `"Not available"` error code. This applies to the case when the *GeoLocation* Object is subscribed. Then SBP sink endpoint should send Subscribe command again not earlier than 5s and not later than 30s to get notification again.

If the GPS receiver has only lost satellite reception, it should encode this into to NMEA sentences and should not return a `"Not available"` error code.

The MirrorLink Client should not provide map-matched coordinates. If available, the MirrorLink Client should use a dead-reckoned position.

The version 2.0 of the GPS service adds a set of new objects, which are not available in version 1.0 version of the service. The SBP protocol is able to handle this. The following items, describe the possible behavior:

- A version 2.0 sink may try to subscribe or access a version 2.0 object from a version 1.0 source. The version 1.0 source shall always respond with a recoverable SBP Error (`"Unknown Object UID"`).

- A version 1.0 sink may subscribe or access to the NMEA object of a version 2.0 source. In case that source operates in a region, where it cannot provide WGS-84, it shall make the NMEA object `"Not available"` for the sink.

Annex A (informative):
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History

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