

ISO/TS 21219-19 - Intelligent transport systems - Traffic and Travel Information (TTI) via Transport Protocol Expert Group, Generation 2 (TPEG2) - Part 19:Weather Information (TPEG2-WEA)

Application Area: [Traffic and Travel Information](#)

Publication Year, Number of Pages: Published 2016, 82 pages

Extract Creation Year: 2022

Standard Topic Group: TPEG2

Standard Topic: informace o počasí

Topic Description: TPEG2, definice aplikace pro informace o počasí.

Introduction, Explanation of Starting Points
popis aplikace; UML diagramy příkladů zpráv, vizualizace zpráv
Description of Architecture, Hierarchies, Roles, and Object Relationships
koncept TPEG zpráv; popis částí zprávy
Description of Process / Function / Method of Use
pravidla pro sestavování zpráv; hierarchické vrstvení zpráv
Description of Interfaces / APIs / System Structure
UML definice zprávy o počasí
Protocol / Algorithm / Computation Definition
Definition of Data Representation / Physical Meaning
definice struktury kontejneru aplikace; definice elementů aplikace; definice binární struktury zprávy; xml schéma zprávy
Definition of Constants / Ranges / Restrictions
číselníky frází; mapování frází do WMO SYNOP

Introduction

The ISO 21219 Technical Specification specifies the TPEG format and protocol for the provision of transport information to end users. TPEG is designed for high bandwidth media, allowing information to be structured with increasing levels of detail and complex location descriptions.

The different traffic event domains are described separately in TPEG, using a platform-independent model (UML) and two derived platform-dependent models (binary and XML). Parts of the specification set out the rules for the creation of the model and its conversion into a platform-dependent form.

More information on the context of TPEG is contained in the introduction to the extract for Part 1 of the TPEG standard (21219-1).

The ISO 21219 technical specification deals with the second generation of the TPEG protocol, abbreviated as TPEG2. The TPEG/TPEG1/TPEG2 distinction is usually only mentioned in the introductory part of the standards/specifications, while other chapters no longer distinguish between TPEG and TPEG2 - this is implicit by context.

This extract (hereafter referred to as the 'document under description') describes Part 19 of the TPEG standard 'Weather Information Application (TPEG2-WEA)', which describes the encoding of weather reports of various sizes.

Note: The extract lists selected chapters of the document described and adopts the original chapter numbering.

Application

The document described sets out how weather information is to be provided. It provides for the presentation of this information to the user. It contains a significant number of enumerations (tables) specifying weather types and also a converter between these tables and WMO SYNOP codes. It is essential for the analysts of the weather service operator and for the analysts of the user terminal (application) manufacturer who are responsible for the design of the system data model and the design of the rules with which the system operates. It shall be used in the design of the system.

1. Scope

The described document defines the TPEG WEA application "Weather Information Application". It allows the provision of weather information for different geographical areas (even hierarchically linked) at different time scales. The weather information can be very detailed. This information is intended for travellers in general and is not limited by the mode of transport, nor is it intended to provide warnings about dangerous weather conditions to drivers, for which another TPEG application (TPEG-TEC, 21219-15) is intended.

2. Related Documents (Selection)

The document described herein provides 3 normative references to TPEG2 ISO 21219 parts 5, 6 and 9. In addition, a number of normative references used in the text are referenced in the References section.

3. Terms and Definitions

This chapter defines 5 terms, including:

message management container; MMC (*message management container*) part of a message containing information for building a message from other "application" and "location" containers or for managing a message (for example, cancelling it).

location referencing container; LRC (*location referencing container*) part of a message containing information about the location of the referenced traffic information or referenced traffic state.

location referencing - a means of enabling the system to accurately identify a location

Další termíny a zkratky z oboru ITS jsou obsaženy ve [slovníku ITS terminology](#).

4. Abbreviations

This chapter sets out 16 abbreviations, the important ones in terms of this extract are:

MMContainer for message management (*Message Management Container*)

ADContainer for application description (*Application Data Container*)

LRContainer for Location Referencing Container

WEA Weather information application (*Weather information application*)

TPEGframework providing formats and protocols for the provision of traffic information, optimised for dissemination via digital radio or the Internet

Note: Additional ITS terms and abbreviations can be found in the Glossary of ITS Terminology (www.itsterminology.org).

5 Conditions and limitations of the application

This chapter (1.5 pages) defines:

- **The application identifier** that is specified for all applications in TS 21219-1.
- **Application version.** The version is crucial from the decoder's point of view, as different versions of the same application may differ in structure, content, etc.
- **The order of the containers of** which the message is composed. A message consists of a Message Management Container (MMC), and optionally an Application Description Container (ADC) and a Location Referencing Container (LRC).
- **Extensibility and backward compatibility**, such as the requirement to skip unknown parts of the message by the decoder and the specification of future extensible parts of TPEG message structures.
- **TPEG service component framework** according to ISO/TS 21219-5.

6 Structure of the WEA

This chapter (scope 1 UML schema) contains the UML model of the WEA application message.

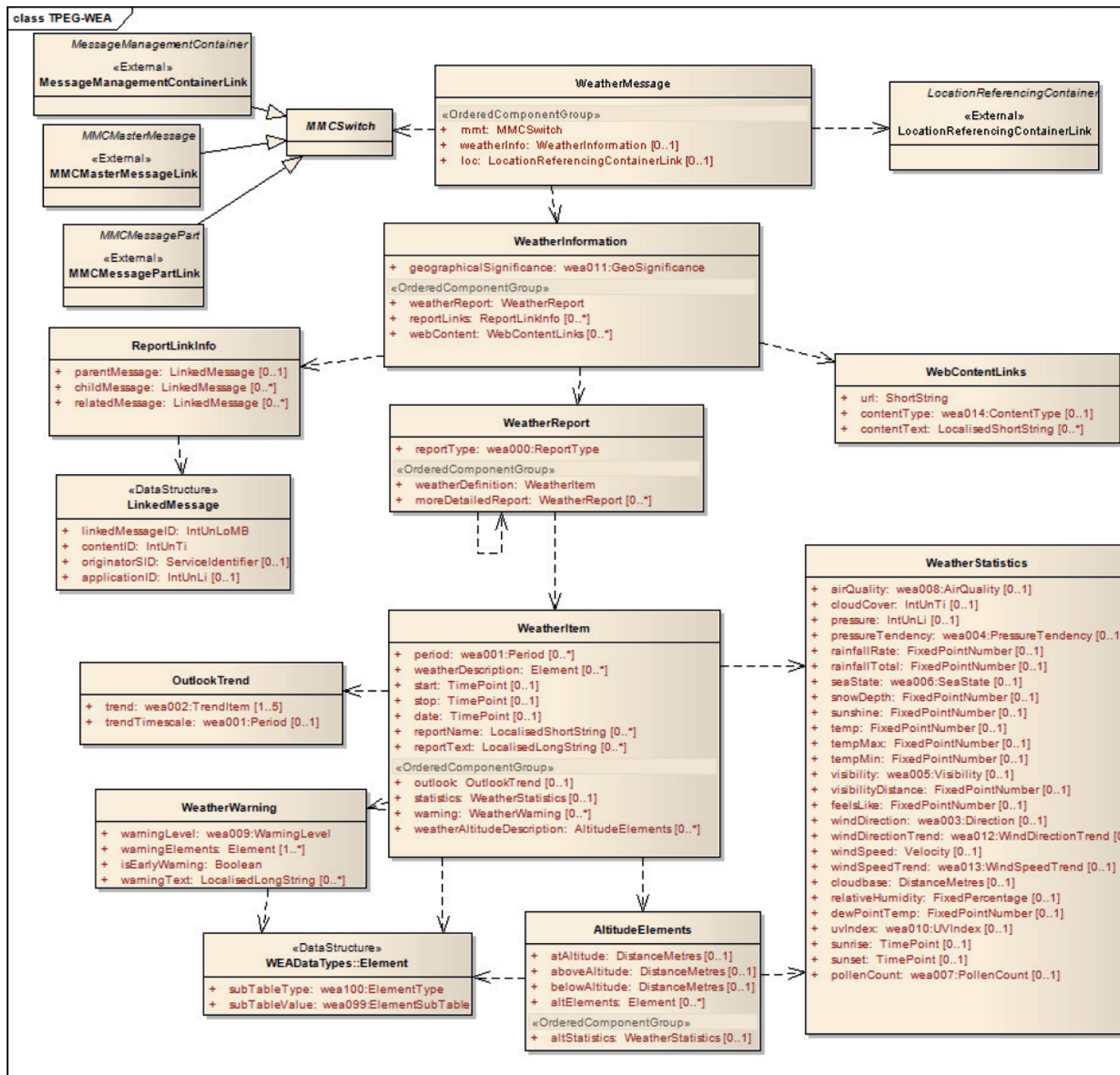


Figure 1 - UML class model of the WEA application (Figure 2 of the standard)

7 Components of the WEA report

This chapter (8 pages, tables, figures) describes the individual components of the WEA report. The aim is to introduce a hierarchical structure of interconnected reports with different forecast coverage or time horizons.

It sets out the basic structure of the WEA report and describes its individual components in detail. The basic message "WeatherMessage" may contain weather information (WeatherInformation) and location information (LocationReferencingContainerLink), not necessarily in one message.

The weather information consists of the type of the described area, the report itself (WeatherReport) and related reports referenced by the ID. Each weather report consists of a report type and item (WeatherItem) and a possible detail report. The item (WeatherItem) already contains specific weather information, including forecasts (OutlookTrend) detailed numerical statistics (WeatherStatistics), warnings about specific weather (WeatherWarning) and the altitude

distribution of the weather (AltitudeElements).

The WeatherStatistics item (ch 7.5) covers 25 weather figures such as temperature, wind, dew point, sunrise, pressure, precipitation and more.

The description of the position is not specified.

8 WEA data types

This chapter (1 page) contains definitions of 2 data structures (types) used. Namely LinkedMessage allowing to hierarchically link messages to each other using messageID and Element qualitatively describing the weather type.

9 WEA tables

This chapter (20 pages in length) contains definitions of the WEA enumeration application types (in 29 tables). The following table lists each table by name and adds a description and example content.

Table 1 - List of WEA tables (source: author of extract)

WEA table	Description	Table of Contents
wea000:ReportType	Report type (0-5)	Ex:002: Daily
wea001:Period	Description of validity period (0-50)	Ref: 019: Dusk
wea002:TrendItem	Weather trend (0-16)	Ex: 004: hotter
wea003:Direction	Weather direction (0-16)	Ex: 013: W (west)
wea004:PressureTendency	Pressure trend (0-6)	Re: 003: Falling
wea005:Visibility	Visibility (0-4)	Ex: 002: Poor
wea006:SeaState	Wave height at sea (0-7)	Ref: 003: Rough
wea007:PollenCount	Amount of pollen particles (0-3)	Re: 002: High
wea008:AirQuality	Weather quality (0-6)	Ex: 003: Unhealthy
wea009:WarningLevel	weather threat level (0-4)	Ex: 002: Bad weather
wea010:UVIndex	UV index (0-11)	Ex: 010: 10-very high
wea011:GeoSignificance	Meaning / range (0-9)	Re: 006: City
wea012:WindDirectionTrend	Wind direction trend (0-2)	Ex: 001: Veering
wea013:WindSpeedTrend	Wind speed trend (0-4)	Ex: 003: Decreasing
wea014:ContentType	Description of content type (0-6)	Ex: 004: Pressure
wea099:ElementSubTable	Table of weather subtypes (0)	empty
wea100:ElementType	Weather element table (0-12)	Ex: 006: wea106_FogElements
wea101:RainElements	Rainy weather description (0-12)	Ex: 012: Damp
wea102:SnowElements	Description of snow weather (0-14)	Ex: 006: Low drifting snow
wea103:SleetHailElements	Bad weather description (0-11)	Ref: 002: Light sleet

wea104:WindElements	Wind weather description (0-27)	Ref: 012: Hurricane
wea105:StormElements	Stormy weather description (0-12)	Ref: 012: Sand storm
wea106:FogElements	Description of foggy weather (0-13)	Re: 004: Shallow fog
wea107:FrostElements	Ice weather description (0-5)	Ex: 004: Severe frost
wea108:SunshineCloudElements	Description of solar cloud cover	Re: 005: A few clouds
wea109:TemperatureElements	Temperature description (0-12)	Ex: 008: Heat-wave
wea110:HazardElements	Threat Description (0-13)	Ex: 005: Landslides
wea200:ElementQualifier	Environment description (0-25)	Ref: 003: Urban areas
wea201:ElementQualifierProbability	Probability of realisation	Ex: 001: 10 %

The following table contains an example of the "wea200:ElementQualifier" table from the document described.

Table 2 - Example of part of the definition of the enumeration type wea200:ElementQualifier (Table 41 of the standard)

Code	Phrases	Comment
000	In some areas	In the overall area referred to, the element may not be present everywhere, but only in some places
001	Low lying areas	Elements such as fog may be more common in valleys and low-lying areas near rivers.
002	High ground	Elements such as frost and snow may be more likely in high areas.
003	Urban areas	Urban areas have their own microclimates, so sometimes they are warmer or smog can be a problem.

Annex A (normative) TPEG-bin representation of WEA

This annex (9 pages) specifies the binary representation of the WEA application for use in DAB. A pseudocode is used to describe the binary representation, where for each keyword of the written structure its binary form is known.

The annex contains separately listed binary representations of the TPEG framework, the WEA message and its components, elements for future extensions and data types. It also contains identifiers of the message components and an explanation of the use of generic TPEG attributes. An example of pseudocode for the binary specification of the WeatherReport element is given in the following table.

Table 3 - Example of pseudocode for the binary specification of the WeatherReport element (Article A.4 of the standard)

<WeatherReport(6)>:=	
<IntUnTi>(6),	: Id of this component

<IntUnLoMB>(lengthComp),	: Number of bytes in the component, except for the id and lengthComp indicators
<IntUnLoMB>(lengthAttr),	: Number of bytes in attributes
<wea000:ReportType>(reportType),	: sets the timeframe of the report
ordered {	
<WeatherItem>(weatherDefinition),	: the main part of the weather report
n * <WeatherReport>(moreDetailedReport)	: optional additional report levels
};	

Annex B (normative) TPEG-ML representation of WEA

This annex (14 pages in length) contains first a separately listed XML schema of the TPEG framework, then the WEA message and its components, elements for future extensions, WEA data types and tables (defined as xs:complexType), see the example in the figure below. It then presents all of the above in a single functional XML schema.

```
<xs:complexType name="WeatherReport">
  <xs:sequence>
    <xs:element name="reportType" type="wea000_ReportType"/>
    <xs:element name="weatherDefinition" type="WeatherItem"/>
    <xs:element name="moreDetailedReport"
      type="WeatherReport" minOccurs="0"
      maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

Figure 2 - XSD snippet specifying the structure of the WeatherReport element (Article B.1.3 of the standard)

Annex C (informative) Elaborated examples

This appendix (5 pages in length) contains possible visualizations of weather information and UML diagrams (mostly unreadable) for 3 examples of weather reporting, ranging from simple to hierarchical area reporting using linked reports.

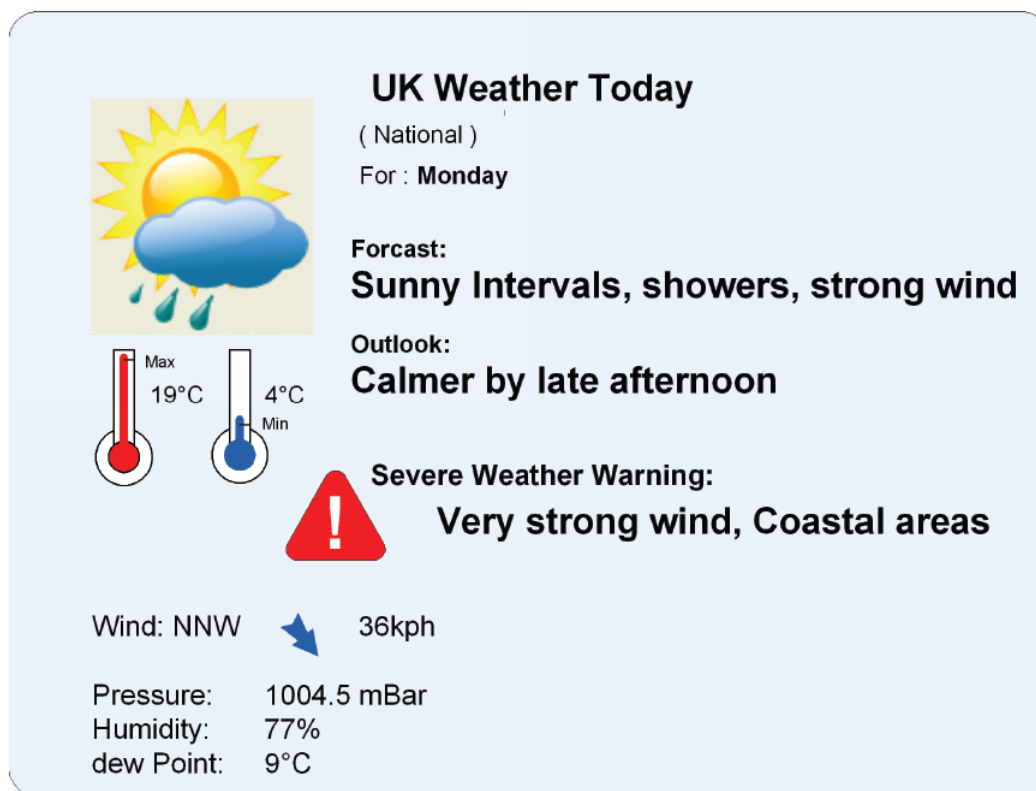


Figure 3 - Sample visualisation of a simple weather report (Figure C.1 of the standard)

Annex D (informative) Recommended translation between WEA and WMO SYNOP tables of observation codes

This annex (6 pages in length) contains a table setting out the links between the SYNOP codes and the codes set out in the document described.

SYNOP code	Element type code	Wea100:ElementT ype	Element code	Element code description	Comm
00 — clear skies	8	wea108_Sunshine- Cloud	0	Clear sky	
01 — clouds dissolving	8	wea108_Sunshine- Cloud	13	Clouds dissolving	
02 — state of sky unchanged					N/4
03 — clouds developing	8	wea108_Sunshine- Cloud	12	Clouds developing	

Figure 4 - Excerpt from the SYNOP and WEA interconnection table (Table D.1 of the standard)

Literature

This section (1 page in length) contains references to literature and standards used in the document described.

- [ISO TS 21219-5 - Intelligent transport systems – Traffic and Travel Information \(TTI\) via Transport Protocol Expert Group, Generation 2 \(TPEG2\) – Part 5: Service Framework](#)
- [CEN ISO TS 21219-6 - Intelligent transport systems – Traffic and Travel Information \(TTI\) via Transport Protocol Expert Group, Generation 2 \(TPEG2\) – Part 6: Message Management Container](#)
- [ISO/TS 21219-9 - Intelligent transport systems – Traffic and Travel Information \(TTI\) via Transport Protocol Expert Group, Generation 2 \(TPEG2\) – Part 9: Service and Network Information](#)

Associated Terms

- [TPEG application](#)