Technical Report

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Intelligent transport systems — Smart streetlighting management platform for road traffic safety enhancement — Overview and use cases

Systèmes de transport intelligents — Plateforme intelligente pour la gestion de l'éclairage public afin d'améliorer la sécurité routière — Présentation générale et cas d'usage

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Foreword

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This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems.*

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

0.1 Background

With the integration of core technologies from the Fourth Industrial Revolution—such as Artificial Intelligence (AI) and big data—along with advancements in streetlighting systems, the development and deployment of smart streetlighting platforms that deliver comprehensive information related to traffic, safety, and the environment are spreading rapidly.

The smart streetlighting management platform (SSMP) is a system in which detection devices—such as closed-circuit television (CCTV) cameras and radar sensors—are installed on roadside streetlights to collect and analyse real-time environmental data. Based on this analysis, the platform provides a range of services, including accident risk alerts, pedestrian safety support, identification of illegally parked or stopped vehicles, and relocation warnings.

For instance, when a pedestrian is crossing at a crosswalk under a flashing green signal and a speeding vehicle is detected approaching the area, the SSMP activates a variable message sign (VMS) and gobo lighting to issue a visual warning to the driver. Simultaneously, an audible alert is broadcast via speakers to inform pedestrians of the approaching vehicle, thereby prompting a swift and safe retreat to the sidewalk.

This document introduces the concept of the SSMP. While the technical content reflects an initial Korean implementation, the purpose of this document is to provide illustrative reference information that can be adapted and applied by other countries and regions considering the adoption of similar platforms, thereby ensuring global relevance.

0.2 Overview

This document introduces the SSMP, developed and implemented in Korea, presented here as a representative case study. While the content reflects the Korean implementation, it is intended as an illustrative, not prescriptive, reference to support international stakeholders planning to establish similar systems and to ensure adaptability across diverse national contexts. It presents general information, system components, and representative use cases of the platform.

The general information section outlines the SSMP's purpose and provides an overview of key service areas—such as crosswalks, crossroads, school zones, tunnels, and bridges—along with methods for delivering safety information, including alerts, warnings, and guidance.

The system components section details the platform's components and core functions, which are categorized into the central platform, local platform, intelligent edge units, and smart streetlighting.

The use case section describes each service provided by the SSMP and explains interactions between its various components. These use cases are based on the Korean implementation and are presented as illustrative examples, not prescriptive requirements, intended to support international understanding and potential adaptation in diverse regional contexts. Annex A provides data definitions established during the development and operation of the SSMP in Korea. In addition, a comparative table is included to support the adoption and operation of SSMP in different national contexts, aligning the data used in Korea with international standards such as National Transportation Communications for Intelligent Transportation Systems (NTCIP) standards and European Telecommunications Standards Institute (ETSI) standards. The comparative information is provided for reference purposes only, without reproducing normative content from those standards, thereby supporting interoperability and facilitating adaptation in global contexts.

0.3 Document approach and layout

This document specifies the following:

a) General information regarding SSMP (Clause 5).

b) System components of SSMP (Clause 6).

c) Use cases of SSMP (Clause 7).

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d) Comparison of data between Korea, NTCIP, and ETSI (Annex A).

The data exchange message comparison table among Korea, NTCIP, and ETSI is available electronically at https://standards.iso.org/iso/tr/19482/ed-1/en.

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Intelligent transport systems — Smart streetlighting management platform for road traffic safety enhancement — Overview and use cases

1 Scope

This document establishes the smart streetlighting management platform (SSMP) as a representative case study, based on the Korean implementation. This document provides practical, non-normative reference information to support other countries considering the adoption of similar systems.

This document provides information on:

— the system components of SSMP, the roles and functions of each individual component;

— the classification, naming, descriptions, and operational procedures of traffic safety service use cases enabled by SSMP.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
smart streetlighting management platform
SSMP
platform that manages smart streetlighting to enhance traffic safety

Note 1 to entry: The SSMP is typically installed on roadside streetlights and can comprise a centre platform, local platforms, intelligent edge units (IEUs), sensor devices and information provision devices.

3.2
centre platform
platform that supervises and coordinates multiple local platforms

Note 1 to entry: The centre platform is usually installed at a traffic information centre.

3.3
local platform
platform that manages multiple intelligent edge units (IEUs)

Note 1 to entry: A local platform can generate response information for detected events.

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3.4
intelligent edge unit
IEU
edge device associated with smart streetlighting

Note 1 to entry: An IEU can collect and process sensor data and provide safety information via information provision devices.

3.5
sensor device
device that collects environmental data

Note 1 to entry: Sensor devices are usually installed on smart streetlighting [e.g. CCTV, radar, road weather information system (RWIS)].

3.6
information provision device
IPD
device that provides safety information to road users

Note 1 to entry: IPDs are usually installed on smart streetlighting [e.g. gobo lighting, variable message sign (VMS), visual signal, speaker].

3.7
smart streetlighting
roadside pole equipped with information provision devices controlled by an intelligent edge unit (IEU)

Note 1 to entry: The IEU relies upon data from sensor devices, which can also be installed on the pole.

4 Abbreviated terms

ASN.1	abstract syntax notation one
C-ITS	cooperative intelligent transport systems
CP	centre platform
IEU	intelligent edge unit
IPD	information provision device
LP	local platform
RWIS	road weather information system
SSMP	smart streetlighting management platform
VMS	variable message sign

5 General Information

5.1 Overview of the smart streetlighting management platform (SSMP)

The SSMP integrates data collected from CCTV, radar, and RWIS sensors in areas with high accident risk—locations where traffic accidents frequently occur. By analysing this integrated data, the platform detects potential incident scenarios that can lead to road traffic accidents and provides corresponding safety information.

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