Technical Report

ISO/TR 24935

Road vehicles — Software update over the air using mobile cellular network

Véhicules routiers — Mise à jour du logiciel à distance (OTA) à l'aide d'un réseau cellulaire mobile

First edition
2025-07

Reference number
ISO/TR 24935:2025(en)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

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.

Introduction

The electronic control units (ECUs) and their software have become major components of road vehicles in recent years. Software, in particular, must be updated as it is frequently revised.

— The need for updating software is more prominent as cybersecurity and passenger safety become more dependent on software.

— The software update operation was usually performed at workshops, which was very inconvenient for vehicle users.

The ECUs requiring software update operations range from a smart key to power train ECUs.

— These days, the software update operation for ECUs has become possible even while vehicles are serviced in gas stations. Moreover, mobile cellular networks can be used to update vehicle software regardless of the vehicle location.

ISO 24089 was published as the standard for vehicle software update engineering. ISO 24089 addresses the requirements on the organization, software update project, infrastructure level, vehicle and vehicle-systems level, software update package and software update campaign, among others. However, ISO 24089 does not address the actual technologies and procedures for updating software.

This document describes an actual experience involving technologies and systems for updating software using mobile cellular networks. In addition, the results of verification by mounting the ECU developed in this document on an actual vehicle are included.

Road vehicles — Software update over the air using mobile cellular network

1 Scope

This document describes use cases and activities for updating software in vehicles over the air using mobile cellular network. This document provides a case study on the use of International Standards in preparing software update packages, managing infrastructure and operation within the vehicles.

This document includes descriptions of a reference model for software update operations and metadata which can be used during the software update operations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 24089, *Road vehicles — Software update engineering*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24089 and the following 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
to archive
to store logs and records on a permanent medium such that they may be *retrieved* (3.9) at a later date

3.2
authentication
act of proving an assertion, such as the identity of a computer system user

3.3
authorization
formal permission to use a product within specified application constraints

3.4
cryptography
discipline that embodies the principles, means, and methods for the transformation of data in order to hide their semantic content, prevent their unauthorized use, or prevent their undetected modification

[SOURCE: ISO/IEC 2382:2015, 2126278]

3.5
Ethernet
communication protocol specified in ISO/IEC/8802-3:2021