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Internet of Things (IoT) - IoT-based management of tangible cultural heritage assets -
Part 2: Use cases

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Internet of Things (IoT) - IoT-based management of tangible cultural heritage assets - Part 2: Use cases

FOREWORD

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ISO/IEC TR 30189-2 has been prepared by subcommittee 41: Internet of Things and Digital Twin, of ISO/IEC joint technical committee 1: Information technology. It is a Technical Report.

The text of Technical Report is based on the following documents:

Draft	Report on voting
JTC1-SC41/619/DTR	JTC1-SC41/643/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, and the ISO/IEC Directives, JTC 1 Supplement available at www.iec.ch/members_experts/refdocs and www.iso.org/directives

A list of all parts in the ISO/IEC 30189 series, published under the general title *Internet of Things (IoT) - IoT-based management of tangible cultural heritage assets*, can be found on the IEC and ISO websites.

INTRODUCTION

Cultural heritage assets refer to museums, historical landmarks, artworks, and other culturally significant artefacts. Managing these assets contributes to their preservation and ensures long-term accessibility for future generations. Cultural heritage management includes activities that prevent damage, deterioration and theft by applying appropriate preservation and protection measures; see ISO 21127:2014 [1], EN 15898:2019 [2], EN 15757:2010 [3] and EN 16893:2018 [4] for more information.

IoT technology supports the management of tangible cultural heritage assets. In particular, IoT-based sensing, monitoring, and location tracking can improve the effectiveness of asset management; see ISO/IEC TR 22417:2017 [5] and ISO/IEC 30141:2018 [6] for more information.

In status monitoring, IoT technology enables tracking of the condition of cultural heritage assets, such as temperature and humidity levels in museums. Monitoring environmental conditions helps prevent damage and deterioration, as certain factors can negatively affect valuable assets. Real-time monitoring enables timely corrective actions and supports preservation under appropriate conditions.

In intrusion detection, IoT technology is utilized to identify the presence of unauthorized animals or persons. This capability is crucial for protecting cultural heritage assets, especially those in remote locations that are susceptible to damage from intrusions. When a camera or sensor detects an intruder, the system issues an alert, enabling a swift response to secure the asset.

In location tracking, IoT technology enables real-time monitoring of asset location and movement through the application of suitable sensors. This helps prevent theft and ensures proper protection of valuable assets. For example, when an artefact is removed from its display, the IoT sensor can trigger an alert, making possible prompt action to secure the asset.

This document describes the use of IoT technology for the management of cultural heritage assets. It provides information and guidelines for developing platforms and services that support IoT-based cultural heritage management.

The ISO/IEC TR 30189 series [7] consists of two parts.

– Part 1 describes a framework for the use of IoT technology for management of tangible cultural heritage assets, which includes the associated functional entities and information flows.
– Part 2 describes a set of use cases for IoT-based management of tangible cultural heritage assets, based on the framework.

1 Scope

This document describes the use cases for IoT-based management of tangible cultural heritage assets, which builds upon the framework provided in ISO/IEC TR 30189-1:2025 [8].

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:

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

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

3.1
cultural heritage
legacy of physical objects and intangible attributes of a group or a society that are inherited from past generations, maintained and protected in the present and preserved for future generations

[SOURCE: ISO 18461:2016 [9], 2.1.3]

3.2
Internet of Things
infrastructure of interconnected entities, people, systems and information resources together with services which processes and reacts to information from the physical world and virtual world

[SOURCE: ISO/IEC 20924:2024 [10], 3.2.8]

4 Abbreviated terms

BIM	building information modelling
GNSS	Global Navigation Satellite System
HBIM	historic building information modelling
IoT	Internet of Things
PII	personally identifiable information
SMS	Short Message Service

5 Use case scenarios

5.1 General

Based on the framework outlined in ISO/IEC TR 30189-1:2025 [8], this document presents specific use cases for IoT-based management of tangible cultural heritage assets. It focuses on standalone cultural heritage assets (e.g. individual items not part of a larger managed collection). Standalone cultural heritage assets refer to individual tangible assets that are not managed as part of a centralized institutional collection. These assets often require unique preservation strategies due to limited institutional support or resources compared to those within larger collections.