TR 78-2:2021
(ICS 49.020)

TECHNICAL REFERENCE

Building facade inspection using unmanned aircraft systems (UAS)

– Part 2 : Specification for quality management and application of artificial intelligence (AI)

Singapore Standards Council

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Foreword

This Technical Reference (TR) was prepared by the Working Group on Building Facade Inspection Using UAS (Part 2) set up by the Technical Committee on Aerospace under the purview of the Manufacturing Standards Committee.

This TR is Part 2 of a series of standards intended to support the inspection of building facades using UAS. It consists of the following parts under the general title "Building facade inspection using unmanned aircraft systems (UAS)":

Part 1 – Process
Part 2 – Specification for quality management and application of artificial intelligence

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

It is presupposed that in the course of their work, users will comply with all relevant regulatory and statutory requirements including the application of associated permits for the conduct of the UAS flights. Some examples of relevant regulations and acts are listed in the Bibliography. The Singapore Standards Council and Enterprise Singapore shall not be responsible for identifying all of such legal obligations.

In preparing this TR, reference was made to the following publications:

a) ISO/IEC 2382-28:1995 – Information technology – Vocabulary – Part 28: Artificial intelligence – Basic concepts and expert systems

b) ISO/IEC 17020:2012 – Conformity assessment – Requirements for the operation of various types of bodies performing inspection

Acknowledgement is made for the use of information from the above publications.

Attention is drawn to the possibility that some of the elements of this TR may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.*

2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*

3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

Building facade inspection using unmanned aircraft systems (UAS) – Part 2: Specification for quality management and application of artificial intelligence

0 Introduction

The use of unmanned aircraft systems (UAS) for the inspection of building facades has the potential to enhance the safety of the buildings in Singapore. This new inspection method allows competent persons (CPs) to see more, better and faster. TR 78-1:2020 gives provisions for inspectors of building facades to use UAS as a means to carry out inspections of building facades.

However, the influx of this data capturing method coupled with the emphasis on effectiveness with efficacy raises the need for a new data analysis method. The use of artificial intelligence (AI) to analyse data collected by the UAS allows the process of building inspection to be even faster, more comprehensive and more reliable. Good AI will be able to match or even improve the average performance metrics of a human assessor in terms of defect detection.

There is no documentation available that provide guidelines on a capable AI system in the context of the inspection of building facades. Reliance on AI in the inspection of building facades without these guidelines may lead to gaps in the quality of the results, data protection and eventually pose hazards to the public.

The above are reasons why this TR was developed to specify the conformance requirements for meeting accreditation standards when using UAS for the inspection of building facades.

1 Scope

This TR specifies the criteria for inspection service providers (ISPs) to carry out building facade inspection services using UAS). The focus of this TR is on setting out the provisions for the following:

a) Competence of the ISP; and

b) Minimum benchmarks of the AI system

2 Normative references

The following referenced documents are indispensable for the application 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.

TR 78-1:2020 Building facade inspection using unmanned aircraft systems Part 1 – Process