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IEEE

IEC 61636-1

Edition 1.0 2016-11

INTERNATIONAL IEEE Std 1636.1™ STANDARD

**Software interface for maintenance information collection and analysis (SIMICA):
Exchanging test results and session information via the extensible markup
language (XML)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.01; 35.060

ISBN 978-2-8322-3684-0

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SOFTWARE INTERFACE FOR MAINTENANCE INFORMATION COLLECTION AND ANALYSIS (SIMICA): EXCHANGING TEST RESULTS AND SESSION INFORMATION VIA THE EXTENSIBLE MARKUP LANGUAGE (XML)

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The text of this standard is based on the following documents:

IEEE Std	FDIS	Report on voting
1636.1 (2013)	91/1360/FDIS	91/1371/RVD

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

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IEEE Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA): Exchanging Test Results and Session Information via the eXtensible Markup Language (XML)

Sponsor

**IEEE Standards Coordinating Committees on
Test and Diagnosis for Electronic Systems (SCC20)**

Approved 23 August 2013

IEEE-SA Standards Board

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Abstract: This standard is intended to promote and facilitate interoperability between components of automatic test systems where test results need to be shared. The standard thus facilitates the capture of test results data in storage devices and databases, facilitating online and offline analysis. The test results schema becomes a class of information that can be used within the SIMICA family of standards. The exchange format utilizes the XML formats.

Keywords: automated test system (ATS), eXtensible markup language (XML), IEEE 1636.1™, session information, Software Interface for Maintenance Information Collection and Analysis (SIMICA), test results, XML schema

IEEE Introduction

This introduction is not part of IEEE Std 1636.1™-2013, IEEE Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA): Exchanging Test Results and Session Information via the eXtensible Markup Language (XML).

Maintainers of complex systems require the ability to capture and share test result information in a way that supports such activities as performance analysis, post-production product improvement, maintenance process improvement, and diagnostic maturation. Principal stakeholders of this project include but are not limited to maintenance organizations within various Departments/Ministries of Defense, the commercial airlines, the automotive industry, and the telecommunications industry. This standard is being developed as a component of the IEEE 1636™ Software Interface for Maintenance Information Collection and Analysis (SIMICA) project. SIMICA's purpose is to specify a software interface for access, exchange, and analysis of product diagnostic and maintenance information. Clause 4, Test results and session information, provides a subset of the data needed to satisfy SIMICA requirements.

The use of formal information models will facilitate exchanging historical test results between information systems and analysis tools. The models will facilitate creating open system software architectures for maturing system diagnostics.

The XML schema described in this standard where appropriate utilizes and references components of the IEEE Std 1671™ schema set.

It is anticipated that these schemas will be used throughout industries that utilize diagnostic and maintenance data as an exchange format that can be understood by humans or machines. In order to ensure wide acceptance throughout the user community, the schemas have been designed to encompass a broad range of use cases. To accommodate use cases beyond the released design, the schemas provide means for user extensibility.

It is anticipated that the IEEE Std 1636.1 schema will be used throughout the automatic test equipment (ATE) industry as an exchange format that can be understood by humans or machines. In order to ensure wide acceptance throughout the user community, the schemas have been designed to encompass a broad range of use cases.

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Software Interface for Maintenance Information Collection and Analysis (SIMICA): Exchanging Test Results and Session Information via the eXtensible Markup Language (XML)

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1. Overview

The XML schema and EXPRESS model described in this document are intended for the recording of the history of the execution and observations from a test or test session. This information includes results data directly generated by test equipment or by the test equipment operating software. The combination of this information will aid in the improvement of the test process.

The XML schema associated with this standard is based on World Wide Web Consortium (W3C)¹ XML eXtensible Markup Language (XML) 1.0 Proposed Edited Recommendation [B1].²

The EXPRESS model associated with this standard is based on ISO 10303-11:1994 [B9].

¹ W3C is a registered trademark of the World Wide Web Consortium.

² Information on references can be found in Annex C.

1.1 Scope

The scope of this standard is the definition of an exchange format, utilizing XML, for exchanging data resulting from executing tests of a unit under test (UUT) via a test program in an automatic test environment. The standard uses the information models of IEEE Std 1636TM-2009³ as a foundation.

1.2 Purpose

The purpose of this standard is to specify a software interface for access, exchange, and analysis of test result information. The standard enables the capture of test results data, facilitating data analysis to assess the effectiveness of test and diagnostic processes applied to complex systems. The test results information model and XML schema define the semantics and exchange format for information to be used among applications implementing the SIMICA family of standards.

1.3 Application

1.3.1 Of this document

This document provides formal specifications of the information required for the development of shared maintenance data and the results of testing. These are applicable to both the SIMICA family of standards and the ATML family of standards.

Anticipated users of this standard include the following:

- a) System developers
- b) System maintainers
- c) Test program set (TPS) developers
- d) TPS maintainers
- e) Automatic test equipment (ATE) system developers
- f) ATE system maintainers
- g) Test instrument developers

1.3.2 Of this document's annexes

This document includes three annexes. Of these three, two are normative (Annex A and Annex B).

Annex A contains the description of each of the XML schema elements and types.

Annex B contains the description of the EXPRESS and EXPRESS-G model elements.

Annex C is informative, and thus are provided strictly as information, for both users and maintainers of this document.

³ Information on references can be found in Clause 2.

1.4 Precedence

In the event of conflict between this document and an SIMICA family component standard, this document shall take precedence.

In the event of conflict between this document and a normatively referenced standard (See Clause 2), the normatively referenced standard, as it applies to the information being produced, shall take precedence.

In the event of conflict between this document's EXPRESS model definition and/or annotations and this document's XML schema definition and/or annotations, this document's EXPRESS model definition and/or annotations, as it applies to the information being produced, shall take precedence.

In the event of conflict between this document's EXPRESS model definition and/or annotations and an SIMICA family component standard and/or EXPRESS model, this document's EXPRESS model definition and/or annotations, as it applies to the information being produced, shall take precedence.

In the event of conflict between this document's XML schema definition and/or annotations and an SIMICA family component standard and/or XML schemas, this document's XML schema definition and/or annotations, as it applies to the information being produced, shall take precedence.

In the event of conflict between this document's XML schema definition and/or annotations and the ATML Common XML schema, this document's XML schema definition and/or annotations, as it applies to the information being produced, shall take precedence.

1.5 Conventions used in this document

1.5.1 General

All simple, complex types attribute groups and elements will be listed; explanatory information will be provided, along with examples if additional clarification is needed. The explanatory information shall include information on the intended use of the elements and/or attributes where the name of the entity does not clearly indicate its intended use. For elements derived from another source type (e.g., an abstract type), only attributes which extend the source type shall be listed; details regarding the base type shall be listed along with the base type.

The namespace prefix "c:" identifies that the type or attribute group is contained in Annex B of IEEE Std 1671TM (Schema-Common.xsd).

When referring to an attribute of an XML element, the convention of *[element]@[attribute]* shall be used. In cases where an attribute name is referred to with no associated element, the attribute name shall be enclosed in single quotes.

In tables that describe XML elements, the column "Use" indicates the occurrence constraints for each element.

- a) "Required" indicates that the element shall appear exactly once.
- b) "Optional" indicates that the element may appear once or not at all.
- c) "1..∞" indicates that the element shall appear at least once and may appear multiple times.
- d) "0..∞" indicates that the element may appear multiple times, once, or not at all.

All specifications for the EXPRESS language are given in the Courier type font which includes references to entity and attribute names in the supporting text.

1.5.2 Word usage

In this document, the word *shall* is used to indicate a mandatory requirement. The word *should* is used to indicate a recommendation. The word *may* is used to indicate a permissible action. The word *can* is used for statements of possibility and capability.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std 1636TM-2009, IEEE Trial-Use Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA).^{4, 5}

IEEE 1636.99TM-2013, IEEE Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA): Common Information Elements.

IEEE Std.1671TM-2010, IEEE Standard for Automatic Test Markup Language (ATML) for Exchanging Automatic Test Equipment and Test Information via XML.

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